

Invisible Communication

A Play Inspired by the Scientist Lydia Villa-Komaroff

by

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## **Abstract**

This science play, *Invisible Communication*, entails scenes of events inspired by the life of molecular biologist Dr. Lydia Villa-Komaroff, who today is an established biology researcher, entrepreneur, and diversity advocate. Taking place during 1965 to 1978, the play follows Lydia through her undergraduate career up until her post-doctorate fellowship where she experiences challenges as one of the few women in her field. From co-founding a minority-based organization to working with poliovirus research, Lydia has her high points, but will also deal with low points while working with recombinant DNA technology. Through this project, Lydia's story is intended to mirror those of other women who continued the legacy for women in science, following the trailblazers who opened the doors for us.

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## INVISIBLE COMMUNICATION

A Play Inspired by the Scientist Lydia Villa-Komaroff

### Author's Note

This play is inspired by Dr. Villa-Komaroff's life and scientific work during the 1970s to early 1980s. All characters, events, and timelines have been altered. These alternations were taken to expand the piece for dramatic intentions, allowing a feel for an exaggeration to factual events, which intends to shine on silenced experiences often forgotten or erased. The following characters are inspired by real scientists: Lydia Villa-Komaroff, Anthony Komaroff, David Baltimore, and Argiris Efstratiadis.

### Characters

LYDIA	20s-30s, biologist, Mexican American.
ANTHONY	20s-40s, physician. White. Lydia's husband.
DAVID	40s, tenured professor at Harvard. White.
ARGIRIS (Arg)	30s, biologist, Greek Immigrant.
MAYLEEN	30s, biologist, African American.

### Setting

Various locations (including Seattle, Boston, Cambridge, New York) during 1965-1978.

Scene 1

1965. Seattle. Health Sciences Library at the University of Washington Medical School.

At rise. Lydia is working at the library. She stands behind a library counter, re-arranging files. On the counter rests a bag of galletas Marias. Anthony walks towards the counter with a backpack. Bookshelves pack around them.

ANTHONY

Here you are!

LYDIA

I sure am.

ANTHONY

Good seeing you – what is it now – the third time this week. Are you studying or working today?

LYDIA

Prying into my business there.

(Lydia steps back.)

ANTHONY

Well, we are friends.

LYDIA

Please. Don't get so conceited. You must meet some qualifications to be *my* friend.

ANTHONY (elbows rested on the counter)

Quiz me! I am more than qualified.

LYDIA (showing files)

I'm joking! I'm working today.

ANTHONY

Alright! Now – new best friend – you aren't packing more work hours than you can take, right? Three days seems a bit over the edge.

LYDIA

It's not as bad as I expected. It's a temporary schedule anyways.

ANTHONY

You don't have to sugarcoat it.

LYDIA

I really am not. There were some recent changes with my classes. I wouldn't consider packing more work hours than needed, unless necessary.

ANTHONY

So, what made it necessary? Did you add a course?

LYDIA

Not exactly. This is a bit embarrassing –

(Lydia slowly moving closer to the counter. She grabs and holds onto the galleta bag.)

ANTHONY

Don't be. I won't judge.

LYDIA

Well...I received my exam score from professor Mercy's class, and I... well...I really didn't do good. And, before you say it can't be that bad – it was.



(Lydia bites the galletas between speaking.)

ANTHONY

I don't understand. I thought you studied well for that. Your analytical chemistry study guide was so in-depth. It was strong!

LYDIA

I don't know really. Maybe it was just me then. I gave myself good studying time, prepared materials, but my performance came short of that. I'm almost sure I had the lowest score.

(Lydia covers her face with her hands.)

ANTHONY

How were you coping from that?

LYDIA

I sought help after a couple of crying sessions, naps, and these galletas that I love so much. I must bring you some next time because –

ANTHONY

You should. I would love that. But not exactly the answer to my question.

LYDIA

I met with my advisor. It was not as I expected, but he suggested Chemistry was not made for people like me, women. In those moments, I came to the realization that I should leave the major.

ANTHONY

I'm truly in shock. My advisors were never so unsupportive, at least never like that.

LYDIA

I wonder why that is.

ANTHONY

So, what are you majoring in now?

LYDIA

Biology. My chemistry advisor noted it as an easier field for women. I'll give it a try.

ANTHONY

Do meet with your new advisor. This is a big change.

LYDIA

One step ahead of you. I only needed to drop two of my courses. Just my luck most science courses start with similar introduction courses.

ANTHONY

I remember those. Make sure to be ready for endless slides on birds too!

LYDIA

What is their deal with birds anyways?

ANTHONY

Evolution. It's all Darwin and his many studies on birds. It really is something.

LYDIA

I bet. I really hope I'll find biology more fitting. My grandmother used to show me her plant studies when I was smaller. She knew so much about them. Their growths, reproduction, and herbal remedies too.

ANTHONY

Bet you rarely got sick for long. Are you wanting to be like her?

LYDIA

I can't say I'll ever be bored, but I do want to check my classes out first.

ANTHONY

I get now why you would consider working more. Your school bills may look different.

Plus, aren't there like late fees for registration or something?

LYDIA

Probably. I've only made the change just this week, so I'll find out soon enough.

ANTHONY (looking around)

I'm sure I'll hear about it! Me and whoever is nosy enough to listen to us.

LYDIA

Majority of the men here could care less. You're probably the only social butterfly.

ANTHONY

What do you mean by that? You're here too.

LYDIA

No, no! Out of the men only. I don't count.

ANTHONY

There are women here.

LYDIA

There's barely any in your class as it is! 60 total students with 12 women and the rest, men.

ANTHONY

But there *are* women. Maybe not at the library all the time. Some have husbands or people at home to be with.

LYDIA

What does that even mean?

(Lydia crosses her arms, blankly staring at Anthony.)

ANTHONY

Well, marriage is common at around our mid-20s age.

LYDIA

For men. It's popular for men. If the women in your program chose medicine, I'm sure marriage is not their priority, even if they are married at the moment.

ANTHONY

I really didn't mean it like that. I just...don't really keep up with everyone. I have my own things, too. Doesn't make me an enemy!

LYDIA

You may not be *the* enemy, Anthony, but you do disregard women. You share classes, labs, and other spaces with them. Yet, you see them under a fixed lens. That stinks as bad.

ANTHONY

... Maybe I do have some biases. I am sorry.

LYDIA

If you are like this, I can only imagine the things my advisor was thinking.

ANTHONY

I'm nowhere near that.

LYDIA

That's beside the point! You still default to making those assumptions. There is a reason we don't see enough of us in these *men* areas.

ANTHONY

It's something to work on. I get that now.

LYDIA

I guess we both have things to work on. My education and your mindset. I really hope Biology and I are meant to be.

ANTHONY

I guess we'll find out if you tell me you switched majors next week!

LYDIA

Stop it! I need to have some stability in my education.

(Lydia crosses her hands over her heart.)

ANTHONY

You'll have it! Look into biology internships over the summer. Many offer research or curriculum-based programs across the nation.

(Lydia offers a cookie to Anthony. He takes it.)

LYDIA

I'll make sure to do that! I'll be here tomorrow too if you decide to come around.

ANTHONY

I'll be here then! You should come and study with me here one day.

LYDIA

Sounds like a plan. Now go and study!

(Lydia eats the last cookie as Anthony begins to leave.)

End of Scene 1

## Scene 2

1970. Summer at MIT. Mayleen and Lydia meet in a small conference room. Both are sitting with notebooks. Lydia's notebook has a paper poking out from it.

MAYLEEN

Thank you for meeting with me before our actual team meeting.

LYDIA

Well, I'm totally up for a meeting with the only other woman in our Biology PhD program.

MAYLEEN

Exactly my thoughts. I really hoped this room wouldn't be locked.

LYDIA

I was prepared just to meet you in one of the lounge areas if we were locked out.

MAYLEEN

Smart backup! If it wasn't for the letters David sent us, I wouldn't know where to go.

I've never been in here.

LYDIA

My husband had told me about David and his protein synthesis work with polio, and we visited a seminar of his. Otherwise, I would also be meeting him for the first time today, or never.

MAYLEEN

You have a husband! Does he work with David?

LYDIA

Anthony's a doctor, so David's work is routinely mentioned amongst the physicians doing medical research. They're good peers!

MAYLEEN

Lucky you! I often don't meet married women in the lab. Or, I just haven't encountered one. What is that like?

LYDIA

What. Marriage? It's not all that different, except the moving in part.

MAYLEEN

Wow! Are you considering kids?

LYDIA

Um, no. Not at the moment. I have plenty of nieces and nephews. Are you?

MAYLEEN

I would need a husband for that. Life just gets busier for me. Between here in the city with biology and my family in the south.

LYDIA

I didn't mean to assume. The kid question comes up a lot when I meet other women.

MAYLEEN

Especially at family events! *When are you getting married? When are the kids coming?* I haven't even started my career; how can I be thinking like that? Cultural feminism is on the edge now!



LYDIA

I've read the articles on that! There's a local group here who meets to dissect all sorts of spaces. It's all here.

(Lydia opens notebook to take a newspaper out. She points to a column on it.)

MAYLEEN

Times are changing. I'm so used to being the only black woman in the room, wish I'd see more, or, just in general of women. We could all be sharing the excitement of starting our projects here, like you and me!

LYDIA

I assume you'll be out there protesting too then!

(David enters.)

And he's here!

DAVID

Greetings ladies. You're here early. Did you both come early to meet?

MAYLEEN

LYDIA

Yes!

We did!

(David sits in a chair.)

DAVID

I'm glad to sense the excitement! True scientists must always come prepared with thoughts and questions. Expect to be on your toes, you two! Are you both familiar with protein synthesis work? The central dogma of how DNA becomes a protein and the reversal of it.

MAYLEEN

Yes. It's in your paper on Reverse Transcriptase.

DAVID

Spot on. We'll be stemming from that in this beginning quarter. This meeting is intended to allocate roles. We must hit the ground running when the program starts soon in less than two weeks.

MAYLEEN

This summer went by so fast; I expect two weeks will be here in no time!

DAVID

Time is a thief. The field is full of excitement right now. New papers have been released and there is new inspiration for all biologists to open new projects. Potential prize winners on the horizon.

LYDIA

Sounds very competitive. What will our project consist of? I can't wait to begin.

(Enter remaining graduate researchers.)

DAVID

Let's just wait for everyone else to settle in.

End of Scene 2

### SCENE 3

1973. Cambridge. David and Lydia are seated in David's office at MIT.

DAVID

I got the notes from the board. The ones who reviewed each poster.

LYDIA

What did they say?

DAVID

Just logistical comments, but they did note our representative – you – was very knowledgeable.

LYDIA

I was asked so many questions! You should have seen it. Some asked about this research, others of our other polio projects over the past three years. Then, there were some who asked for you.

DAVID

Everyone sees the articles published, but articles don't reveal the journey! These events are the place you peck the researchers with a dozen questions. Our work was the only RNA panel on poliovirus. It's novel.

LYDIA

Makes more sense why they may be looking for potential collaborations with you.

DAVID

Oh yes! They wanted to see me in person to give them an answer. I get letters every now and then requesting I send my results or that we collaborate labs. I must wait for MIT

directors even to approve collaborations, unless one day they loosen their policies amongst campuses.

LYDIA

They will eventually. A lot of presenters were products of collaborations. Is it always the same demographics? I felt more diluted than ever.

DAVID

Each year, and every year since its beginnings, we see the same people at the same conference. There will always be men, but women are slowly joining. Soon enough we'll see more.

LYDIA

There is a great movement leaning in that direction, especially with feminism at peak.

DAVID

You and Mayleen may see more women colleagues. I know you too mention the local feminist gatherings! We'll probably see an immersion here at MIT, who knows.

LYDIA

There are great movements happening, besides here! I met a whole group of scientists that were either Native-American or Mexican American. About 50 of us, where there was a total attendance of 350 scientists at this conference.

DAVID

Oh! You refer to how there aren't enough minority scientists. I see. Both men and women.

LYDIA

Yes, David!

DAVID

I haven't paid much attention to that in general. Much less in smaller spaces, like our labs.

LYDIA

Got that right. A lot of people don't notice the under-representation. The lack of diversity of not just gender but of ethnicities and races.

DAVID

Sounds to me like you have a passion for it! You're as excited as that day we shared the polio results with the NIH. What did you and the other minority scientists discuss?

LYDIA

A lot. The session was more a conversation than a lecture. So, I was able to hear everyone's stories, including their research. Oh, it was so lovely! I met two women from the west coast who are actively trying to partner there with a scientist in Mexico, Hermania Pasantes.

(Lydia begins to move closer to the edge of her seat.)

DAVID

I've read her work! Smart biologist. Last I read in the journals was that she was moving internationally. Working with a Swedish team.

LYDIA

Well, see! I wouldn't have heard of her had I not gone to the conference. I felt such an adrenaline rush. I've never heard of another Mexican in biology whose work spoke for her.

DAVID

You could have asked me, too.

LYDIA

As knowledgeable and wise as you are, you don't share your news with your graduate students.

DAVID

I guess our entire lab team will be having a news discussion at our weekly meetings.

LYDIA

Also, this may be sudden, but the group and I decided to work on building an organization made for minority biologists.

(Lydia rises from seat.)

DAVID

You were holding that secret in weren't you. What else?

LYDIA

All of us are in different states. My outreach is focused on Massachusetts schools, such as ours. Would you be up –

DAVID

Count me in. I didn't mention this earlier, but the higher-ups here have discussed the start-up of other organizations and policies that were not named, except for one on DNA cloning regulation updates.

LYDIA

Wonder why they're updating the regulations. The conference had a session on the subject, but it was at the same time as the minority conversation. I wasn't about to give up that opportunity.

DAVID

I need to plan our potential projects with poliovirus to keep expanding our specialty with it, but if the university and the National Institute of Health are considering more regulations, something else may be happening.

LYDIA

We'd all have to investigate it.

DAVID

Yes, we would. Cloning in general and through recombinant DNA has already sparked disputes. The opinions are personal. A bit political. Even revolutionary. Presenting a proposal before the state and the NIH may pose some difficulties, so it'd be good to have a strong team to back it up. If I decided to go this route.

LYDIA

With it being so new, I'm sure many biologists are poking around the subject.

DAVID

Our poliovirus work deals with RNA and proteins that could merge with virology using this technique.

LYDIA

It is a strong way towards a new publication. It is so cutting edge.

DAVID

It's a biology revolution. It could be your doctoral dissertation.

LYDIA

That would be fun! The team and I have begun discussing our thesis ideas.

DAVID

Well, now we have two topics for our upcoming team meeting: news and thesis. Also, let your husband know I am still expecting a visit.

LYDIA

If I see him tonight!

(Lydia exits.)

End of Scene 3



Scene 4

1975. Lydia in her graduate workroom at MIT. She is rummaging through her filing cabinet. Around the corner, Mayleen appears.

MAYLEEN

Now what you are doing down there?

LYDIA

Trying to find a paper, an important one.

(Lydia points to the filing cabinet.)

MAYLEEN

On what exactly?

LYDIA

A...publication of David's.

MAYLEEN

Ask him for a copy. I'm sure he keeps those files in his office.

LYDIA

Well, listen. He gave me a copy of his paper when I asked. Now, I can't find it.

MAYLEEN

So, get a new copy from his files.

LYDIA

No. I had specific notes on this specific copy. I can't remember what I wrote specifically, but they smart notes.

MAYLEEN

Was it a very smart moment you had where your brain is just on fire, and everything felt like an oasis? I've had those moments too.

LYDIA

I think it was like that. My annotations referred to some details convincing David to join Fotis and me. There were motivating pointers.

(Lydia quickly moves towards Mayleen.)

MAYLEEN

So he still doesn't know about your postdoc plan? They're both such huge nerds in the field! How'd *you* manage to get in Fotis's lab? I know it wasn't easy.

LYDIA

I asked him. Anthony and I went to Fotis' seminar on Silk Moths.

MAYLEEN

Oh yeah! Your husband works at Harvard now. I should consider a husband for these good connections.

LYDIA

Oh please! It was luck. We both talked about being direct with Fotis and ask about spots in his lab.

MAYLEEN

I admire that. Not everyone's husband is so supportive.

LYDIA

He's always been at my side. I mean, he's been helping me with some logistical work on an organization I'm cofounding. He always meets me halfway with anything.

MAYLEEN

I say this not to scare you, Lydia. It's different here at MIT, but Harvard may not be as united, and even if Anthony is over there, it won't mean much with a team of men. I've heard things from the women over there. The men can be more intense.

LYDIA

I appreciate you watching my back. Now make yourself useful and help me clean this desk! I need to find that darn paper. It should have a red paperclip and annotations all over.

(Lydia places her hand on Mayleen's shoulder before pointing to her messy office.)

MAYLEEN

I don't get paid enough for this.

(Mayleen move towards the desk and Lydia to the filing cabinet.)

LYDIA

None of us does!

MAYLEEN

What paper is it exactly?

LYDIA

His RNA to DNA discovery of reverse transcriptase! The one where he redefined the central dogma.

MAYLEEN

Yes! His Nobel prize submission too. Everyone has been talking about it here. They're saying it's another validation for MIT... since they coined themselves an innovative school with prides for community strength. All those men, they talk.

LYDIA

There's always so much excitement here.

MAYLEEN

That you can join in on too! You literally ended up with a load of papers from the polio project -- found it. (Holding up the paper)

(David enters.)

DAVID

Such spontaneity, Lydia. Why was I told by Fotis – not you – about your postbac acceptance to Fotis's lab?

LYDIA

Had you not walked in here just now, I would be heading to you to tell you.

MAYLEEN

She really was. I saw it.

(Mayleen hands Lydia the paper.)

DAVID

Fotis wouldn't shut up about the initiation site of the system and how the protein synthesis examinations of the poliovirus RNAs were strong. I agree but to have two advisors, I don't know about that.

LYDIA

The work overlaps a lot with the poliovirus work. It would be marvelous for you both to combine brains as my advisors. Academia is moving towards a two-advisor system. We are studying proteins!

DAVID

I see that! No previous student has had two-advisors at MIT, especially between two campuses.

MAYLEEN

Then be the first. There are no set rules on it. Be like the many African American women who paved the doors for me. You must be the first; not for yourself, but for everyone else like you. The rest of the active researchers and mentors.

LYDIA

Couldn't have said it any better. So, is that a yes?

DAVID

After getting the confirmation it'd be feasible, which it...technically is. The answer is yes.

LYDIA

I'll get to making the calls! We need to assemble the hypothesis.

(Lydia moves towards her desk to get started on her new work.)

End of Scene 4

Scene 5

1976. In a Harvard Lab. Lydia is moving towards a fridge, putting away her samples in tubes.

LYDIA

One treatment down! 5 more...to go.

(Anthony enters with briefcase.)

ANTHONY

Are you conducting an experiment right now?

LYDIA

No, I finished a couple of minutes ago. Is it lunch time already?

ANTHONY

Not for another two hours. Are you too busy?

LYDIA

Yes, but I have time. You're my clock you know. Time is not a thing here!

ANTHONY

I can tell.

LYDIA

You arrive, it's lunchtime. But not today, so why are you here? News? I know you didn't leave work early for nothing.

(Anthony sets briefcase down to open. Gets out an envelope letter.)

ANTHONY

You should be a spy! I do have news. It may not be the good kind either. Well, here...read it and let me know.

(There is a pause for Lydia to read a letter from David Baltimore.)

LYDIA

*Dear Lydia. This needed to be told this way. No one knows about this, so keep this information to yourself for now. A hearing is expected for the Recombinant DNA technology usage and its ethics. The voices are ready to shut it down, and truthfully, I am, too, not enough knowledge...Be prepared. Talk soon.*

*David.*

I'll be forced to stop. A ban hearing is underway in the city.

ANTHONY

I know, dear. The conversations have only escalated. Nasty propaganda is calling it the next science ego, since the genetically modified foods.

LYDIA

I expected an escalation from the public, but from scientists!

ANTHONY

It's political.

LYDIA

The letter was for discretion then. A call might anticipate eavesdropping. Who knows who might be on his shoulder?

ANTHONY

It's Mayor Alfred Vellucci. You told me he was plotting a case against genetic engineering. I investigated, and he's spreading a hoax story on genetic engineering techniques. He termed recombinant DNA as an attempt to release a super-gene, one that could create Frankensteins!

LYDIA

Unbelievable! All of Cambridge could be under attack with that. We know as much as we can with our technologies. I haven't had made progress with my current project here at Harvard.

ANTHONY

You need a plan if Mayor Alfred gets as he wants. He will push for a complete ban. Harvard will close the lab down, and so will everyone else. You'll be cornered to quit researching.

LYDIA

What a disaster! So selfish! I need more time with my work. I can't quit. I haven't seen successful results come out from my protocols.

ANTHONY

I was not going to suggest that you quit. A relocation would help.

LYDIA

It'd give me more time. But to where? My funding might be stopped.

ANTHONY

D.C., New York...

LYDIA

There's a lab in New York. Cold Spring Harbor Laboratory.

ANTHONY

That's a good connection. Is the lab part of David's?



LYDIA

No. Tom Maniatis. Friends with Arg.

ANTHONY

Argiris from your team here?

LYDIA

The one and only. He told me about his friend up there who bounces back and forth with his temporary lab.

ANTHONY

Isn't that a dream.

LYDIA

It is indeed. I must still ask for permission to join, but that's one plan.

ANTHONY

We cannot count on this ban being temporary.

LYDIA

It would or it could not be a long separation.

ANTHONY

I won't be joining you in New York. I'll send any mail of importance.

LYDIA

Keep an eye for any SACNAS information. I need to be as informed with the organization. My postdoc is almost to its half-way point. I really want to see it through.

ANTHONY

We'll know soon enough what happens. Let's think about food.

LYDIA

Our usual from the Mexican lady at the square please?

ANTHONY

I'll be back!

End of Scene 5

Scene 6

1977. In New York at Cold Spring Harbor Laboratory. Lydia is wearing gloves and cleaning the lab bench. Her back is to the door, not noticing as Argiris enters. Suddenly, Lydia throws the rag to the side, hitting the beakers.

ARGIRIS

Not a good time for you?

LYDIA

Arg. I didn't notice you come in.

(Lydia quickly re-organizes the beakers.)

ARGIRIS

Too distracted! I'm in town to visit with David, thought I'd pop in here to check on you.

(Arg moves around observing the lab.)

LYDIA

You mean ask me about my results. How I am still in the same bubble as before.

ARGIRIS

You are being too emotional right now. You've been here at Cold Spring Harbor for almost a year. Your goal to clone the eggshell genes was to --

LYDIA

Try and get these eggshell genes to clone then transform! They have not been easy. That's why I can't get any results. The bacterial cells won't take up the genes I've recombined.

(Lydia removes her gloves and throws them away.)

ARGIRIS

How long have you been in here?

LYDIA

I didn't exactly keep track of the time. Maybe since yesterday.

ARGIRIS

You do not look so well, woman. If Anthony came, he'd tell you how unhealthy you look.

LYDIA

He's been trying to come here but he's under so much stress, too. I planned on getting some food. I was getting ready to leave. I mean, you saw me cleaning!

ARGIRIS

I did.

LYDIA

Arg, I've built more restriction enzymes from synthetic biology materials. I can't figure out what to manipulate in my technique to get the transformation step to succeed. If it could just do that, the experiment could move forward to cloning then developing proteins from a hybrid DNA.

ARGIRIS

The few journal articles out comment little on the steps. There would need to be more experiments to discover why your bacterium rejects the recombined DNA. It is information we don't know just yet.

LYDIA

I don't have more funding for a different bacterium. I'm limited on supplies at the moment.

ARGIRIS

And we can't send you any new materials since the ban at Cambridge. Only to share our brains whenever we *can* come to you.

LYDIA

Anthony calls to update me sometimes. I haven't heard much positivity about the ban. I'm still waiting on confirmation from a non-profit organization proposal, too.

ARGIRIS

Everything is slower with City Hall. Some researchers at Harvard and I have recently discussed a voting of scientists could appeal the mayor's hoax story and case.

LYDIA

This mayor is mad for wanting an indefinite moratorium on our technology. What other scientists are working with recombinant DNA?

ARGIRIS

Well, I've heard about some in California and the capital.

LYDIA

If there is any hope to return to normalcy, we need more working on this.

ARGIRIS

You need a team to work with back at Harvard. You're here at Cold Springs working so much but aren't inching closer to acquiring results that show a hybrid DNA.

LYDIA

It's a team job that I'm doing by myself. Not because I'm slow, but because I know my own mind is infected. An attack from my own self, it's a failure on my part...every day feels so stretched out. So long. And I grow nowhere closer to solidifying my methodology. My postbac has no backbone!

ARGIRIS

A fellowship is always an option. You could just join us back at Harvard This is a difficult time for all of us back at Harvard too.

(David enters.)

DAVID

Lydia. Your postbac may not have enough data for the completion of your postbac. As a team, it is wise to consider the options of what that could mean. That's why I decided to just come down here and talk it out in one setting. The letters became difficult to keep up with.

ARGIRIS

There's got to be another angle to see this from. We can re-brief your steps. Try to catch the gaps maybe, or even consider a different plan for it in a fellowship.

DAVID

It would be so much easier had Harvard not restricted everything.

LYDIA

This year may just be a long one for sure.

End of Scene 6

Scene 7

1978. Evening. At Harvard, in the Wally Gilbert Lab. Arg and Lydia enter the lab, Lydia with a letter in her hand.

LYDIA

The Cambridge weather sure has cooled down fast.

ARGIRIS

It sure has changed, and it really set us behind getting closed in at home with all that snow from last week.

LYDIA

I hope the positives show good results. I don't think the extended time in the incubators could have affected them.

ARGIRIS

I'll get them out of the incubator. Turn on the light. Is that a resignation letter?

LYDIA

No! It's an invitation from SACNAS.

ARGIRIS

Whoops. You held it so cautiously. Almost thought it was top secret stuff. Who is that anyways?

(They arrange the agarose plates on the lab bench and begin examining them.)

LYDIA

I wouldn't leave this place, not willingly...and are you ready for it: Society for the Advancement of Chicanos/Hispanics and Native Americans in Science. The president just announced our official, nationally funded SACNAS conference!

ARGIRIS

A conference of what?

LYDIA

Mentoring. Research Symposiums. Lectures. You name it! Other national scientists and I will meet. Scientists from across the nation.

ARGIRIS

So cool! I've never of that. Are you presenting?

LYDIA

Yes, I've been invited to present my research – this one.

ARGIRIS

Your eggshell genes over your rat insulin? Yeah, I understand why.

LYDIA

Oh, come on, Arg. I finished my postbac without the research component, so I extended the project into this fellowship. That failure had to mean something.

ARGIRIS

This is much more exciting than regular eggshell genes. We're working with a rat's insulinoma! All infested with insulin proteins we can extract their genes from to recombine with a bacterium for us.

LYDIA

The lives that may be saved if this hybrid DNA clones, transforms, and starts producing the insulin protein – if only my grandma were still alive to receive this.



ARGIRIS

It'd change the health distribution of insulin for sure. These plates are not showing growth. We should skip them.

LYDIA

We have 15 more on the table. Let's just finish inspecting them all.

ARGIRIS

I'm moving to the next ones.

(He slides some plates towards Lydia's side.)

LYDIA

Alright. I just want to double-check...any plate with growth...

ARGIRIS

Our inserts' antibiotic markers will tell us if they're resistant or not. You know –

LYDIA

This! This right here. The plate has a patch of colony growth, no ring of sensitivity! Look here–

(She holds the plate high in the air.)

ARGIRIS

Oh, my, goodness. I see it. It's a hybrid, isn't it? What clone is that?

(He grabs the plate from Lydia's hands.)

LYDIA

Clone p147. It darn is. The markers we inserted are showing growth. The cells must have the hybrid gene to code for the insulin protein.

ARGIRIS

Lydia, I think this is it. Go find David!

LYDIA

David! Get inside. Quick!

(She peaks out the door of the lab and calls for David. David soon enters.)

DAVID

You ruckus-making woman. Are you pregnant or something? What's wrong?

LYDIA

Gosh no. Check this! The hybrid gene was expressed.

(Arg passing the plate to David.)

DAVID

Have you told your lab director, Gilbert?

ARGIRIS

You're the first to know.

LYDIA

David. Can you believe it worked? Our research worked. I must tell Anthony! My parents!

DAVID

This is going to make the news. It'll be news. Congratulations!

(David passes the plate back to Lydia.)

LYDIA

There's a processing tool in the lab to confirm DNA encoding for specific proteins. We can confirm that this transformed bacterial cell can synthesize Insulin, and then present the results to the director.

DAVID

You'll need to begin writing the research article for publications. To announce the news, news outlets would be good first.

LYDIA

I don't have their contacts. How do I –

DAVID

*Nature* or even the New York Times may be good. I'll pass them to you.

ARGIRIS

A seminar can be hosted next. Just like you David and Fotis did.

LYDIA

Wouldn't we need to publish the article first?

DAVID

Not yet. You can hold off on it. It'll bring more scientists in to hear you. Many will have questions.

LYDIA

It's so much. I'm equally excited and nervous.

DAVID

And there will be more. You've never experienced the bliss after making such a discovery. The phones will be ringing non-stop next week! You intersected medicine with genetic engineering. This *is* the glory to research, Lydia. Live it.

LYDIA

This is more than I imagined, especially after last year.

ARGIRIS

You're going to be presenting this at SACNAS for sure then. Let me join you?

LYDIA

Permission granted.

(All move out, Lydia carrying *the* plate.)

End of play

### Reflective Essay on the Development of *Invisible Communication*

For my Honors thesis, I developed a science play, *Invisible Communication*, inspired by Dr. Lydia Villa-Komaroff. The merging of science and drama produces an opportunity for the audience to be entertained while they learn. I took inspiration from my favorite science play, *Silent Sky* by Lauren Gunderson, to begin my own. Gunderson beautifully portrayed the life of Henrietta Leavitt, who became one of the first women astronomers, and showcased themes of legacy and family. Her story resonated with themes that are still echoed in the difficulties faced today for women in science. Choosing to craft my own play stemmed from that and refined my focus to search for a woman who's recent but in the middle of picking up the legacy left by trailblazers, like Leavitt. Dr. Lydia Villa-Komaroff fit that description, while also being of Mexican heritage and pursuing a biology career, as I am too; I saw representation for others and myself by selecting her. She was the seed of inspiration.

Within this play are illustrated events from Dr. Lydia Villa-Komaroff's early academic life that posed challenges, motivations, and questionings of her purpose as a biologist and scholar. In addition, the drama includes a true biological event that pivoted the scientific work and life of Lydia's out of the others, which was the controversy of recombinant DNA. The development of the play, with a bundle of lessons embedded, included researching, brainstorming, and drafting with many moments of revision. It was an experience unlike any in my past, as this was my first in-depth attempt at playwriting. Within this essay, I will dissect my playwriting experience in terms of explanations and lessons learned from the difficulties and positives, while also including solutions to better reflect on the final product – the science play.

During the research phase of my play, I found some familiarity relating to past work I've done as a biology major: organic chemistry lab reports, a genetic poster presentation, and even an argumentative essay on student debt. I inspected Dr. Villa-Komaroff's background related to biology from a scientific approach – questioning and hypothesizing to then assembling a product. Thus, I envisioned my entire research process as an open question to who Lydia was and how her life was defined (including work, relationships, family, and academia). This perspective helped me envision possible dramatic plots with her being a student, biologist, diversity advocate, and academic educator. These plot points were events with the potential to be scenes in my science play. Among the many sources, there was a primary source of an interview with Lydia that provided me with great insight to her character and thoughts about her experiences. Most of my scenes' events were discussed in this interview. Ultimately, however, this knowledge and learning development led to a web of scattered thoughts in my mind with no clear focus. There was an overabundance of sources, and my thoughts weren't fixed, just scattered. As much fun as I found researching her and her work, I had to narrow my focus to build the plot and be selective in doing so.

In this next segment, I orchestrated the plot of the play. My decision for the timeframe was based on biology research and academia getting some speed in innovation and discoveries that are actively used today. It was a time where social issues were still being addressed and spaces were having to be made. The events for this timeframe were established during this process. I only focused on events during the timeframe (about 1970s to 1980s) that best fit together. I defined this connection by a controversy that was popular in the 70s, which was recombinant DNA, and its direct impact on a stage in

Lydia's life. I wanted the scenes to build up to this big event because of the influence it had on Lydia's career, as many doors of opportunity opened for her in its wake. However, in an effort to preserve themes I aimed to highlight, such as uplifting minority voices, I needed to exaggerate certain life events to capture silencing issues experienced by women in STEM in the 70s through Lydia. This "exaggeration" meant taking real events or activities Dr. Villa-Komaroff partook in and manipulating them, so the scenes would reflect moral issues. I found it difficult to lay out how my scenes would appear because each scene needed to connect and layer the plot's goals; in addition, the development of scene descriptions and character lists was another stump I experienced for the same reasons. I didn't want to begin writing without having a clear thought or intention of each scene. As a result, I wrote out goals for each scene with my developed character list and brainstormed settings that were fitting; however, that didn't mean it was perfect because I did make changes after revisions. I deleted a character originally part of scene 2, and, instead, used another existing character and further developed her to best fit the scene's goal.

Then, the writing followed. This stage was the most difficult. None of my past works could amount to this experience with playwriting. In retrospect, I learned that each word weighs a lot, highlighting how there is so much intention in the words. Actors and directors depend so much on what is on paper to bring plays to life. I truly understood this after receiving comments of there being gaps in not only my characters but also my scenes' plots (such as the purpose of SACNAS relating to Lydia in scene 3). I didn't realize how much information I was withholding as I wrote until this was brought up from feedback. This discovery pushed me to view my play as a visual blueprint of my

words and to measure how much of it was connecting tissue between and within scenes. This effort helped me understand that developing the characters need to be seen through what is instructed on paper: from when and how they enter in a scene with, to what they meddle with in that scene. Every word is intentionally and actively painting an illustration for the actors and audience to pick up on.

Furthermore, in this stage of the process, I discovered how covering so much time (a decade) was not easy to capture in a one-act play. Initially, the plan was to have four scenes, but after actively writing, it became evident that more scenes were needed to fully capture the details of Lydia's life. The seven finished scenes all showcase events in Lydia's higher education journey that were based on factual occurrences that ultimately defined Dr. Villa-Komaroff as a biologist. All seven fit into the timeframe and culminated in Lydia's first highpoint in academia, her discovery that bacteria could be induced to produce insulin, which was a limited resource back then, leading to her national recognition by SACNAS. These were the beginning stages of Dr. Villa-Komaroff's career, cementing her place in the field of biology, as she eventually became an established educator, businesswoman, and researcher. As I revisited my word intentionality, I understood building conversations in each scene more clearly. I gathered that so many details could be presented between two characters, while also learning about them and the zeitgeist of their time. The controversy of recombinant DNA is historical fact, and in scene 5, I aimed to highlight the setting that would be brought up again in the following scenes as Lydia traversed through this difficult moment as a scientist.

In conclusion, the development of *Invisible Communication* helped me better comprehend representation and storytelling through playwrighting. Each stage



encouraged personal reflection and growth from difficulties and positives faced. The time poured into blossoming my play gave me the opportunity to also reflect on my definition of being a woman in STEM and how I intend to venture in my pre-medical path as a scientist and minority who, like Lydia, must advocate for diversity and enjoy science. I intend to, one day, extend this project by developing a spot for writing in my life.

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