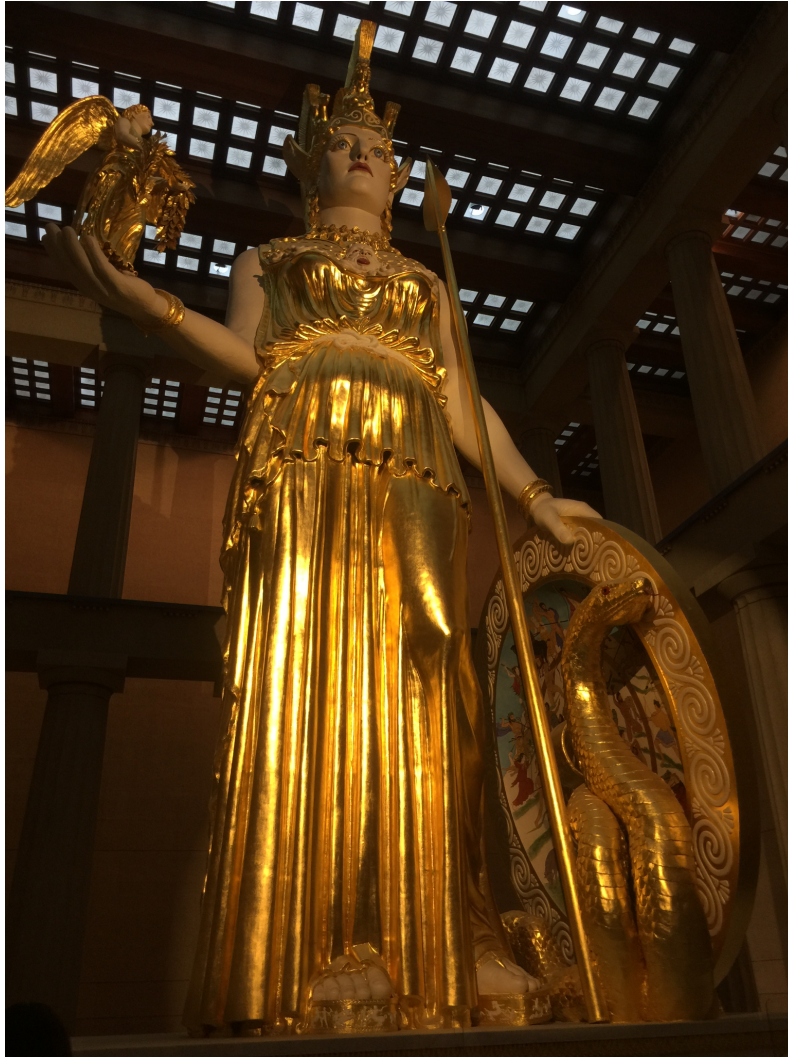


Athena's Island

a musical about the power of women in Biochemistry



Athena's Island: Synopsis

Athena's Island is an original musical based on the story of real-life UC Berkeley professor Jennifer Doudna, winner of the Nobel Prize in Chemistry in 2020 for her work to make CRISPR gene editing possible in humans. This technology has transformed the world of biotechnology, and has made its impact in the development of Covid-19 vaccines and the treatment of genetic disorders such as Huntington's Disease and Sickle Cell Anemia. The story takes us from a pandemic response call for testing technology in March of 2020 in Berkeley, back to the story of Jennifer's inspirational hero Dr. Rosalind Franklin (who first photographed the double helix of DNA) in 1951 at King's College in London, and then forward to Jennifer's incredible family story of a move to Hilo, Hawaii and her eventual rise to renown in the world of science . Twenty songs capture the story of Jennifer's odyssey and of her collaboration and competition with scientists like her co-Nobel winner Emmanuelle Charpentier, her woolly-mammoth-obsessed vegan mentor George Church, or the competitive Harvard & Stanford guru Feng Zhang. These characters are rock stars! So why not make a musical about them? This musical calls us to learn the story of our pioneers in Science and to celebrate a future of hope.

Athena's Island: Characters

JENNIFER	a brilliant, competitive, troublemaking (in a good way) scientist.
ROSALIND	the pioneering scientist behind the discovery of the DNA double helix. Steadfast, Cautioning, sincere. She is a ghost.
MARTIN	Athena's father. A poet in the truest sense; a person of action
DOROTHY	Athena's mother--also a teacher. Brilliant, comforting, hopeful for her family
JAMIE	Athena's husband and confidant
CHURCH	a nature--obsessed scientist with a bushy beard. He loves woolly mammoths
EMMA	Athena's French colleague & co-Nobel prize winner, collaborator
FENG	Athena's East Coast rival. He's an ambitious, cutthroat scientist with a flair for the daring. He mysteriously seems to be just one step ahead of the current research
LANDER	Feng's mentor, a catalyst for controversy. He's "East Coast." Harvard (Broad Institute)
ELDORA	Athena's lawyer--a fiesty intellectual with a background in Science.
RACHEL	Athena's loyal student, friend, and eventual colleague at Caribou
ANDY	Athena's son, an Engineering student at Berkeley
SAMUEL	Athena's colleague who also grapples with the ethics of gene modification
STEVE	A high school friend
	KOLTER a Harvard Professor
	JACK a mentor
ENSEMBLE	various high school and college students, lab technicians, and news reporters

Athena's Island Track Sheet

<u>Act I</u>	<u>Page Numbers</u>	<u>Duration</u>
1. Prelude/ "Project Athena"	5-6	2:14
2. Overture/ "Rat Race"	7-8	4:51
3. "A Man's Game"	9-10	2:49
4. "55 Letters"	10-11	3:39
5. "Island Thing"	12	3:28
6. "Poetry of Science"	15	2:47
7. "Like a Volcano"	16-17	3:39
8. "Double Helix"	18-19	3:38
9. "1981"	19-21	6:52
10. "My Rainbow"	23-24	2:32
11. "Berkeley C-A"	24-25	4:08
12. "One Last Mountain"	26-27	4:36
 <u>Act II</u>		
13. "Free Speech Movement Cafe"	29-30	2:51
14. "Something Big"	31-32	2:08
15. "The Rat Race" Reprise	32-33	1:56
16. "The Nightmare"	34	1:03
17. "Double Helix" Reprise	35	0:43
18. "We Make the Chain"	26-37	2:45
19. "Proud of You"	38-39	3:01
20. "On The Verge"	40	4:30

1. Prelude (April, 2020)

The theater should be stirring with house lights on but with some sort of DNA/RNA molecular structure and formulas projected on the walls--preferably scrolling. Pre-show music is ambient tones and voice-over messages of phone conversations, ventilators/respirators, muffled announcements--all expressing the countdown to a launch of sorts.

The curtain is already open to a minimalist set consisting of a scrim flanked by curtains and a podium with the logo of The University of California, Berkeley on it. An American flag is stage left of the podium, a California state flag stage right.

The music fades with the house lights, and an announcement is made from the PA system as a projection of the words "Berkeley, 2020" appear on the proscenium :

ELDORA: Ladies and gentlemen. This is an important announcement. In a moment, the doctor will take the stage. We appreciate you coming together by Zoom on such short notice. We know that you are all brilliant people--some of whom don't get along. Nonetheless, we are going to need to give the doctor your undivided attention. And please, turn off your cellphones--as nothing can leave this room. We have a virus to kill.

Athena takes the stage, moving with concerned gravitas.

"Project Athena"

JENNIFER (*music starts*):

I sing of times that are troubled
And I look to you, with hat in hand
Thinking that we've gotta make the world understand
Some will say that we are crazy, and others won't even comprehend
But the science we are making 's not about making friends (It's about saving lives)

We've fought for patents, stakes in the claim,
Piles of money, medals, prizes, fame
But in our business, people, it's Nature that's the game
Finding answers to the questions that plague us just the same

Yesterday-I had to get my son from Fresno--stuck outside a school event
 They had to cancel the big Robotics tournament
 We realized the gravitas along the 99, going into quarantine
 We've got to see the warning signs, and figure out what they mean

Let's set up testing for this menacing disease
 Coronavirus can't bring us to our knees
 Join up, form bonds--we've got to create teams
 Some for testing, and some to make vaccines

Repeat Chorus:

ENSEMBLE: sings a harmony of "oooooooohs"

We've fought for patents, stakes in the claim,
 Piles of money, medals, prizes, fame
 But in our business, people, it's Nature that's the game
 Finding answers to the questions that plague us just the same
 We'll work together 'round the clock until the job gets done (CODA)--Just Jennifer

[spoken, over chords which continue]:

"And call this project Athena, for wisdom she's the one."

Jennifer Talking to the audience as the podium comes off:

Let's not forget the ones who came before and showed us not to waste
 a moment we have to seize, we've got to win the race

The music shifts and performers in white lab coats enter the theater space from the house. They take the stage for the opening ensemble dance number, the Overture, which then becomes "Rat Race"

Dance Break

Projection: "King's College, London. 1951"

2. Overture/"Rat Race"

NARRATOR/ELDORA:

Here we go, into the know of something new
 A time to change the world and see the inner truth
 Will they think that what we did was ultimately wrong
 when we uncover what was there all along?
 We'll find the shape and make a map of all these building blocks of life
 The DNA you see we have to find the code inside of you and me...
 We believe...

ENSEMBLE: In the rat race. The rat race (echo "the rat race, the rat race")
 In the rat race. The rat race (echo "the rat race, the rat race") (2x)

It started here--1951 in London town
 With Maurice Wilkins who knew how to keep a woman down [*he snaps his head back*]
 There was a battle as he met his female protege
 Young Rosalind Franklin who had so much more to say
 And to x-ray...

[*blends into a slowed-down, rich harmony and lighting shift as Rosalind Franklin, 31 moves downstage to a spotlight to sing a solo verse*):

ROSALIND: [singing]

I want to fit right in and start my new career
 I need to know the shape--make DNA so clear
 That way we could discover all that life's about
 And cure this world of things [*notices Wilkins entering with Crick and Watson*] I just can't talk about...

SCIENTIST: [*in circus ringmaster fashion--spotlight on her*]. Enter the trio of Watson, Crick,
 [*coughs*]...and Wilkins [*who reacts with servitude*]

CRICK: (*over a staccato snare*)

Enter ME, Sir Francis Crick, I am a scientist you see [*arrogantly*]
 I don't hold back, I want to find the secrets of discovery,

can't you see, but I need--someone who's strong and has my back
I need to be part of this team--without the others I'm just me

[Watson moves to the limelight]//[stop chords, then resume]

WATSON:

That's me, James Watson from Chicago, don't you know
I started college at fifteen, and now there's lots of things I know
About the viruses that overtake our cells
I'm problematic--static, tragic-- in many of my views
I speak my mind and find I'm always givin' everyone the blues

WATSON, CRICK,

We get such a bad rap for being thieves

& WILKINS

but if you study your history there's more there to see
We simply jumped the gun on the data Ros'nd' found
Who us [they look at eachother]? Keep a woman down?
She's the one always wearing a cold frown
In the rat race, we were determined to win the crown [hold harmony]

SCIENTIST

Ladies and Gentlemen: The wonderful men of Science! *[speaks as she gives each of them a gold medal that says "Nobel Prize" but on their backs (they do not see the back of the ribbon hangs a sign that says "Rosalind Deserves a Nobel Prize." She mocks them as they pose for a picture ala "The Victorian Prudes" (their backs to the audience)]*
[all of the lab rats rejoin the stage]

ENSEMBLE: In the rat race. The rat race--the rat race, the rat race

{music fades out as the ensemble members leave the stage in a conga line. Rosalind moves to center stage with a spot on her from above.}

3. "A Man's Game"

ROSALIND (re-emerges from the split sea of scientists):

I don't like how they treat me--men so worried about my makeup
 I'll have to shakeup--the lab they think is theirs
 Without me--they'll never find the shape of DNA--
 But will it matter?
 Or will they take credit for my work without my name,
 I'm getting tired--of always playing by their rules, in a man's game

How absurd to be obscured-- cast aside in my casualness
 To capture the double helix, I'll have to take the risk
 Expose myself to radiation--make the DNA revelation

Will anyone care
 Oh they'll take credit for my work without my name,
 I'm oh so tired--of always playing by their rules, in a man's game

Their teacher's lounge is so much better--
 playing cards and sipping brandy--they look at me like I'm candy
 If I could travel ahead in time, meet a woman with the eyes for Science like mine
 If on the verge, she needed encouragement, someone to remind her that she could do it
 I would tell her
 To wear the suits, to do the trials and to stand resolute
 I'll watch over her, so she'll feel safe as she beats them at their own game
 I will tell her
 That this world of Science will no longer, be just a man's game

[the guitar chords will blend into a wall of synth/strings as the scene transitions]

Projection states "Washington, D.C., 1971"

The scene shifts to a cluttered bedroom in a studio apartment. It's clearly humid--as Martin and his wife Dorothy fan themselves. Dorothy sits on the bed reading while the young man stands at a desk that's covered in papers. A typewriter and cups of coffee/clutter denote trails without tribulation. A seven-year old Jennifer sits downstage with her sister (4) as they play with a giant fall leaf, while her parents Martin and Dorothy, discuss the 55 letters Martin has submitted to universities as he looks for a professorship.

MARTIN *[nervously pacing]* I'm worried. Honey, maybe there was a typo on my resume, something that is the reason I'm not getting ANY offers. Honey. Fifty-four letters to universities and not ONE response. No leads, no bites! All of that grad school, all of those novels, essays--for what??

DOROTHY Shh. Let's not worry the kids. Besides, you WILL get a job eventually. Heck, you can always teach high school.

MARTIN *[as he goes through the mail].* I guess, but I'm a PhD. now and well, this is what I want to do. Wait. *[He pauses at a letter in a manila envelope. The music starts.]*

4. "55 Letters"

MARTIN:
 Here it is, the last of the replies.
 I want to open it but I can't, not with these eyes
 I'm nervous, but I want to try
 I've studied Homer and the American Romantics
 Fallen for Austen, love Walt Whitman's antics
 But to read this one letter is more than I can bear
 I want to be a professor--but where?
 This one must be from the Islands
 A place where I have never been
 So far from anywhere
 A place where we can begin again
 But is it ok for you, and the girls?
 What will you do
 Make new friends, chase wild island squirrels?

DOROTHY:

They will do what I do, adapt

To any world they can think of

They are girls. I'm Penelope.

And they have our love.

I'll teach too, and explore this new place

Be it Boston, or Utah or the space

Between you and me [*turns his worrisome face to hers*]

F

I'll open it then, it'll tell us what we're going to do

Remember what Rumi said, "the entire universe is inside [of] you."

MARTIN:

Ok then, and if it's a no--we'll keep trying

We'll find someplace to go (*pause before the duet*)

MARTIN:

55 letters and there's just one left

but this one's all that matters

Let us fall in love all over again

This love is all that matters

one place in the world

one final test

Go ahead and open it

And we'll deal

with the hand we steal

I'll tell the girls

We'll have to get all new clothes

I don't need much to my name

Our world will never be the same

I love you

DOROTHY:

I love you

I will go wherever you go

We'll be ok I know

This love is all that matters

one space for our girls

no moment's rest

here I go

opening the seal

reveal...

[*Dorothy smiles*]

Hawaii is so far [*they face the audience*]

for us to move to

but the beauty of nature there [*they turn to each other*]

will make the girls more aware

I love you

(18 minute mark}

The family get suitcases and quickly walk toward the shifting scene (moving stage RT to stage LT) --an airport gate. The music shifts and as the family emerges from the new stage LT portal, they are wearing leis and smiles as they're greeted by friendly Hawaiians.

5. "Island Thing"

ENSEMBLE (singing):

Aloha is the spirit we bring to you today

Just call it an island thing

From our hearts to your hearts, it's time to make a brand new start

Just call it an island thing

Let's call it an island thing

Welcome to this paradise, nature's glory recognized

[*Hawaiian air crew mocks them*] Just what will these haoles do

Welcome to Hilo's open arms--the weather here is always warm

And here is a song for you

We give out our song to you

[*music shifts to a more traditional Hawaiian percussion and even dance--an opportunity for a polynesian group to perform, then into an a capella section and into some traditional instrumental music/ Hawaiian hula-style dance*]

Hawaiian

English Translation

**Translation by Pikake Wilson-Kealoha (Kamehameha Schools, Hawaii)*

‘O kekahi mo’olelo no keia wahi i

Kapa ‘ia no ke ‘ano o ke kaula i

ho’ohana ‘ia no ka ho’opa’a ‘ana

i ko ke ali’i nui wa’a i ka ‘aekai ia

One legend about this place

Is that it's named for a knot of rope

Used to tie our king's great boat

As he stopped here and waited

Ia e huaka’i ana ma keia ‘aina nei

Ua hilo ‘ia ke aho ke aloha

‘A’ohe mea nana e ku’e

Two strands twisted

The center of life

A braid of hair

No one can resist its beauty

[*dance break and into chorus twice more*]

Just call it an island thing

Let's call it an island thing

Just call it an island thing

Let's call it an island thing

21 minute mark

Projection: "Hilo, Hawaii, 1973"

A nine-year old Jennifer sits on the floor of the living room that's adjacent to the kitchen. We can see that she's reading the book Little Women by Louis May Alcott. It's the Doudna home, 70's style wood paneling. Mom is making lunch. The two wear Hawaiian comfort clothing.

JENNIFER: I like this book but the girls seem a bit silly. Did kids talk like that back then?

DOROTHY: I bet they did. And they did all of their chores or got whipped. [*she states it matter-of-factly and then breaks into a smile, turns to Jennifer*].

JENNIFER: Is Concord, Massachusetts still like that now, with all of those authors' homes all close together? Ralph Waldo Emerson? Henry David Thoreau, Louisa May Alcott, and Longfellow?

DOROTHY: Yes, they are all close together, and you can visit them. Maybe someday we can go there and see them--all of those places. And Walden pond.

JENNIFER: Daddy says that Walden pond is so close to the town, and that it's a short walk--less than TWO miles away. That's silly since Henry David Thoreau said he was living way out in Nature and all. Was he lying? Did he really stick up for the slaves too by refusing to pay taxes or was he lying about that too?

[Meanwhile, we see Jennifer's dad quietly walk in smiling. Dorothy sees him and smiles back, but he's sneaking in to surprise Athena. And he does. She squeals with glee as he interrupts her question by talking in a mid-atlantic accent].

MARTIN: [pretending to be Thoreau]: "Truth strikes us from behind and in the dark, as well as from before and in broad day-light" [*he tickles her and they all laugh*]

DOROTHY: oh daddy you scared me.

MARTIN: It's ok. This way you'll be ready for anything [*he comes to the table and kisses Dorothy, grabs a piece of pineapple that's cut and ready for dinner.*]

MARTIN: Jennifer. I got you something on my trip to Nashville [*he holds something behind his back*]

JENNIFER What is it?

MARTIN It's Athena. Oh, and a book.

JENNIFER Oh, Daddy, she's cool. And small.

MARTIN She may be small but in Nashville she's 42 feet tall

JENNIFER Wow, that's big

MARTIN Well, she's the goddess of wisdom; of course she's big. She was built there for the state centennial in 1897. She's holding a small statue of Nike, which represents victory. And she's got a spear with a snake at her feet, and the beautiful shield that Perseus used to fight off the Medusa.

JENNIFER That's a lot of stuff

MARTIN She's got a lot of weapons, and she gives them to heroes to use. Lots of guys like Perseus and Odysseus would be nothing without her.

JENNIFER I want to be like her.

MARTIN No doubt you will. You already are [*he munches on pineapple and then turns to bring his suitcase into the other room. Jennifer calls out to him about the book he's also left on the table*]

JENNIFER Dad. What's this? [*she faces the audience and holds up the book*]. "Double Helix." I wonder what this is...

The music shifts as she reads. Projections behind and around her indicate science formulas, images of chemical reactions and atom structures. Music and the voice of Watson surround her. She eventually falls asleep and into a dream...

6. "Poetry of Science"

JENNIFER

The poetry of science--speaks to me, talks to me, makes me see
The poetry of science--is all around, in the sounds, of the waves I hear

[JENNIFER walks into a changed set--a cave or area surrounded by nature]

My dad is a professor here in town, gives me books, I drink them down
History and music, Chemistry, Biology so many things
I can see Nature all around, I want to know just what it's all about *[music slows]*

Here, in this cave, I feel wonder, I smell life and turn a page
Reading this, holding that *[she holds the Double Helix book]*
There has got to be more, there is no going back...

I know, it's here--a sense of wonder and excitement and of fear
[builds back up to original style...]

The poetry of science--speaks to me, talks to me, makes me see
The poetry of science--is all around, in the sounds, of the waves I hear

Here, in this place, an island filled with beauty and with grace
(spoken: why ever would I leave this place?)

But maybe I could go, somewhere I could find out all I need to know
But for now, I'll go within, stay so quiet, and so blonde, too tall and thin

The poetry of science--speaks to me, talks to me, makes me see
The poetry of science--is all around, in the sounds, of the waves I hear

{the music plays as Athena grows, walking through various scenes--being teased, sitting in classes, doodling, being laughed at--pointed at. She then is clearly now a teenager, less awkward, hair no longer in pigtails, wearing a gown. She encounters a boy}

STEVE I noticed you were reading a book about science.

JENNIFER Yeah [*she is reading a green covered book called "Silent Spring" by Rachel Carlson*] (1962)

STEVE I think that's pretty hot

JENNIFER Just "pretty" hot? Do you even know what this is about?

STEVE Smoking weed?

JENNIFER No--it's about the environment and how we're basically screwed unless we do something about what we're doing to this planet

STEVE Hmm? Is it really that bad?

JENNIFER If we don't do anything about it? Sure.

STEVE {*Pause, realizing that being dumb isn't going to win Athena's attention*}
I think I want to be a lawyer. Land rights around here are pretty corrupt. My uncle is fighting some developers. That seems cool to me.

JENNIFER [*Looks at him squarely*] It's good to have a cause. You should do it. I have a class.

7. "Like a Volcano"

STEVE {*moving toward the audience*}
I don't get it--she's unlike anyone I've met before
So smart, so direct--her mind is like an open door--
tellin' me that there's so much more--that I need to look for
She's intense--more than anyone I've ever met
Like James Dean with a cigarette--she's so confident
Like fire underneath the sea--pushing me to find the key
Just like a Volcano

DOROTHY: [who sees and hears the boy speak of her daughter. She smiles]

Yes, I know her. so I am not surprised
 I can see it in her eyes, that she worries, and for her I worry too
 Beyond this island the world is cruel
 But she'll never be a fool, she's makin' her own rules
 Just like a Volcano

MARTIN:

Don't worry, baby, she's your girl through and through
 And when the time comes she'll know just what to do
 We've taught her so well, to think strongly and for herself
 She's so much more than her books stuck on a shelf

ROSALIND:

She'll collaborate and make others around her great
 Beneath this tectonic plate--there is so much more
 There's so much more beyond this island shore
 Brewing underneath this ocean floor
 Just like a volcano

{music speeds up. We see the 4 singers move to four corners of the stage as the ensemble moves in--it's a group of 70's high schoolers, in a class, moving at a rapid pace. Athena moves to the middle of the circle of students, slowly conducting experiments, reading, testing vials--while the other teens move about their lives--dancing, flirting, laughing--being normal teens}

ENSEMBLE:

Like a volcano	the pressure's building up
Like a volcano	we just can't get enough
Like a volcano	this place we call our home
Like a volcano	the science of the genome
Like a volcano	it's going to explode
Like a volcano	a story never told
Like a volcano	oooooooooh

[the teens suddenly move in slow motion as the lights change. The focus is on Athena, now lit from a single spot directly above her. She's in a lab coat and wears goggles and gloves, and stares into a test beaker. Projections denote some sort of molecular sequence. Athena puts down the beaker and takes off her goggles and gloves as she emerges from the "floating" students]

JENNIFER: Watson's book--the one my father gave me--*The Double Helix*, changed my life. This book--I thought at first was a detective novel--opened me up to an unseen world of wonder--inside of our cells. Rosalind Franklin's work to uncover the structure of this DNA, spoke to me. In the codes of the DNA was a secret language that built proteins--proteins that help us to break down our food into energy, to sense light, or even to fight viruses. Maybe this double helix could explain the Humble Plant I found around Hilo that responds to touch by drooping. I could stay in Hilo, I could go to college here *[she looks back at her peers]* I decided to study Chemistry at Cal State Pomona. I wanted to know more about Nature...

8. "Double Helix"

Living my life in the double helix, and all that surrounds me
Knowing there's more living in the middle--the center of all things
Cuz when I stop and think about you--and all the life that lies within you--
there's nothing else for me left to do--but try to find my way right back through
To you

Walking away from this island living, so far from Hawaii
I have to find what the story tells me, and how it involves me
Cuz when I look at things around me, I see there's so much more to know and see
I know just what I want to be, and here what nature's telling me:
"There's you"

It's a mystery what life will bring (but I know there's much more)
In these pages there are tales (like whales singing songs-- beyond the shores)
I want to hear their story, travel across the sea, discover gold and glory
And you

Sailing away now to California, I know what I'll study
 I'll read the signs of the chain reactions and the codes of the body
 And when they tell me I'm not there yet--I'll tell them that I have no regrets
 I'll gather up my confidence, to pass even the toughest test
 For you

It's so clear to me that life can mean so much more behind this door
 Let me find my dream, discovering the-things-I-know I can explore
 I want to know the chemistry, alive inside of you and me
 And see what Rosalind could see
 It's you

There's no denying the double helix, and all that it tells me
 I'll meet the men who made this science famous, and one day they'll know me
 I need to know the secrets, to understand the double helix
 And work to find the many treatments, the answer's right here in the sequence
 It's true

There's no denying the double helix, and all that it tells me

34 minute mark

9. "1981"

[the projection reveals: 'Fall, 1981: Pomona, California. Freshman Year'. While Jennifer changes into a more mature, early 80's look, the undergrads of Pomona in green and yellow gold, enter to an rock riff

ENSEMBLE:

It's 1981--an era of rock and fun, we've got something for everyone
 North of L.A--we know just how to play--wear baby oil in the sun

Regan was shot but we want to smoke some pot and study a little bit
 We've got MTV (and something called HIV)
 But there's no way it can get me...

VALLEY GIRL

I'm a Valley Girl, looking so "rad" tonight, with spandex and ponytail tight
Shopping's my thing/ I'll get a wedding ring, and I'll never be allowed to sing

JOCK DUDE

My name is Dean and baseball, it is my thing; I'll be buyin' this girl a ring
Pro ball won't work out, but I'll have a job no doubt cuz my dad gives me everything

ENSEMBLE:

It's 1981--an era of rock and fun, we've got something for everyone
North of L.A.--we know just how to play--wear baby oil in the sun

RICH GIRL

I'm a rich girl and I live in L.A.
My car is a drop-top Cabriolet
I drive home each weekend to see dad and mom
(*spoken after music cuts out--comically*)
Look at that hot guy--is that TOM? [*she follows him in intrigue*]

JENNIFER (*speaking over guitar part*)

Here I was, Cal Poly Pomona majoring in Chemistry.
Most of the kids had cars and drove home on the weekends to L.A. or to Santa Barbara. Me? I stayed in my room and only got to call my parents once a month--collect. Things were hard.

[*singing--Over strummed chords*]

Maybe I should switch majors
All these other kids just to go to ragers
I talked to my French professor; she said no--
that Chemistry was my destiny--this I should know.

People believed in me--let the record show
My next year was easier and I loved the lab
I wanted Harvard for grad school, so I told my dad

He said “go for it” like he always did--but I doubted myself--(and it was expensive)
 Then in my junior year I broke through the wall
 Treated like an equal--allowed to make the calls
 Taking chances--allowed to fail
 The Science oh how it dances--like I knew it could do

[the college kids leave the set and are replaced by students in more wintry clothes. A sign indicating Harvard University will be projected or part of the set as Watson in a tweed jacket emerges]. Harpsichord will replace the 80s keyboard sound of “1981” (2/4 time feel)--Watson can have a crunchy voice

WATSON:

Harvard is the benchmark and the critical space
 Where learning and research are well in place
 I hear some hot shots are joining our program
 Some girl named “DOWWDNAH,” has got some sort of “plan” *[gestures quotes]*
 She’s a Cal Poly grad making her way East
 I hope she can handle herself, Harvard’s a beast
 And what’s this with RNA? Has she gone insane?

KOLTER

I’m Robert Kolter and I study bacteria
 I’ve got researchers here from Spain and Latin America
 Jennifer’s been inspired by our lab’s diversity
 When it comes to research we like to make things spicy
 Improvisation and trusting our instincts
 Letting scientists take chances--THAT is our thing

JACK

[speaking as the jazz plays underneath his narrative]

It’s 1986 and I’m Jack Szostak. I supervised Doudna as DNA got big. The human genome project began to explode, with scientists like Collins and Craig Venter (go Vikings) working to encode the entire sequence--of DNA! But I had a feeling something else was coming. I had a hunch that DNA might not be the thing to change everything. What about RNA? Could it clone itself? Maybe IT could be the secret to human life. Why do the research everyone else was doing?

JENNIFER

It was clear that I had to take a chance
 Just as in sports or in romance
 Or in choosing to leave Hilo--I had to do something new
 Create an RNA enzyme--something bold to pursue
 At age twenty three I would meet James Watson
 He called me Ms. Doudna, he knows who I am

40 minute mark

[no music, just for these lines]

JAMIE: At Harvard, Jennifer, *[coughs]* Athena, found herself becoming more interested in RNA. This research pulled her West, to Colorado--where she met ME, Jamie Cate *[gestures to whisper, comically]*, her husband. I fell in love with Athena in Colorado, and wanted to join her at Yale. They made me take my qualifying exams again--but I aced them--and I got a job at Yale too. I'm hangin' with Athena. Do you honestly think I wouldn't pass those tests with flying colors? *[get a laugh!]*

[He moves downstage as the music starts up--simple chords from the next song, "My Rainbow"] Jennifer, aka Athena, and I used x-rays to explore RNA, much like how Rosalind Franklin used x-rays to find the double helix of DNA. I used a molecule that helped us see the RNA better, and we made a life together. But in 1995 we learned that Jennifer's dad was sick with cancer--melanoma--and it had metastasized and was now in his brain. He had just months to live. Athena had to be a warrior once again, this time to support and to learn from her dad. She travelled back and forth from Yale to Hilo...

The set is a bedroom and desk in a cluttered room, rife with books, papers, and medicines. Jennifer sits in a chair next to her sick father. He's in bed but is sitting up, eager to learn and to share ideas with his daughter.

10. “My Rainbow”

MARTIN

I'm so very proud, of who you are, having crossed the ocean, from so far

To teach me to teach me

I, who once taught you the words to use, have become your student, you're my muse

And I am honored, I'm honored To be your father, your father

They say a father's first born, is his son--she can box and throw and hit and run.

But you are more than boy or girl--you are the best of both worlds

Something in between something complete--you're the reason that my life's so sweet

And I hate to leave you here but I'll be smiling on you

You're my rainbow, it's so good to know I don't want to go, but you'll need to remember:

I want you to explain this to me--the Science only you can see

And in doing so you will better know how to teach it to the world

There's one thing I have learned in teaching:

Is that clarity is everything

And your science it will change the world--I know this is true

I'll be there for you

In the sky so blue

I'll look down to you

You'll know love is true

You're my rainbow--it's so good to know

Yes I love you --but I've got to go, but it's alright

You're my rainbow--it's so good to know

I love you--and you've got to know--that I'll see you again

JENNIFER: And just like that, he was gone. My daddy. A frail shell of a man, whose soul was larger than a constellation. We would take his ashes to Waipio Bay. It was a very windy day. There, as the sun crept through the clouds and the breeze flapped our

clothing, we cast him up and away. Just then, an io, a Hawaiian hawk could be seen overhead. Soaring. Rare. Majestic. It was you, daddy. You are with me always.

[Double Helix reprise music starts, much slower]

And when I doubt what I can do, I just think of you

[strums/fingerpicking accompany Athena's spoken words]

Soon after dad died, Jamie and I were able to find the shape of RNA and how we could eventually make it an enzyme that could edit genes. Jamie and I got married in 2000, and we had a baby boy--Andy. He looks a bit like my dad. In 2002, Jamie and I both got jobs at UC Berkeley (Go Bears!). Here was a chance to teach at a public University, and to meet some interesting people.

[chord resolves and lights fade out]

44:30 mark

11. "Berkeley C-A"

ENSEMBLE:

Living here in Berkeley C-A, we have so much more to say

There's no other place so right for ideas to strike and to make our way

Green trees you know what we mean--and the sunshine warms us on most days

Climb the hills and you will see why we can't live any other place *[4 Berkeley "characters" enter]*

A horn-harmony-chord progression plays as characters walk about, living their Berkeley lives.

ENSEMBLE 1:

Diversity it sets the tone and so I know I'm not alone (I'm gonna find my way)

Dogs and walks and coffee shops you might even meet Mr. Spock today

ENSEMBLE 2:

Record stores and open doors--home prices soar--we want the Oakland A's to stay

We've got lots of stuff to eat--avoiding meat, we like to keep it green all day

REPEAT CHORUS

ENSEMBLE:

Living here in Berkeley C-A, we have so much more to say
 There's no other place so right for ideas to strike and to make our way
 Green trees you know what we mean--and the sunshine warms us on most days

ENSEMBLE 3:

You call us crazy socialists--we win wars without our fists--gonna help the poor someday
 Standing up for women's rights, Black Lives matter alright--we're gonna win the fight

ENSEMBLE 4:

And as if that's not enough, we tough--we got the Free Speech Movement cafe
 Chez Panisse and a "Naked Run" --we the place to have some fun--for nobel prizes we're the one

REPEAT CHORUS

ENSEMBLE:

Living here in Berkeley C-A, we have so much more to say
 There's no other place so right for ideas to strike and to make our way
 Green trees you know what we mean--and the sunshine warms us on most days

[chords continue as the Doudnas walk across the stage with their baby in a Bjorn holder].

RACHEL: Jennifer and Jamie found their home in Berkeley--and soon, our Athena would learn of the technology she would come to advance. But there were others on the verge, watching, listening, competing. This is the Bay Area, after all. People box on the street over a new home listing (joke :)). Enter Feng Zheng [*pronounced Fung Jung*] and the boys from Harvard. They were also working on a way to make snippets of RNA cut through and change DNA. The race was on: how to change a gene--not just in yogurt--but in a person--with the use of enzymes...

12. "One Last Mountain"

FENG

I was born near Beijing--in what's considered a small town where I'm from
 Just 4.3--million people--now that's a lot of dim sum.
 My mom taught Computer Science, and my dad was a university Admin
 They taught me how to win
 Mom visited the USA and knew we had to stay--to make our way
 She taught me respect, and discipline--took me to computer camp.
 That and the movie *Jurassic Park* were my ramp--into genetics, and Biochemistry

Chorus

I climbed a mountain but I'm still climbing-- there's so much left to see
 So much more to be, so much opportunity

It all started with an experiment, making cells fluorescent
 And then I watched a close friend battle mental illness--consider ending his life
 I had to find a way to make it stop, make everything alright

CHURCH

I am George Church, also a Harvard man, although the unconventional type
 I once taught Athena, and now Feng Zhang, but things are not alright
 I feel that he stole some of my research--taking credit for it
 I'm a woolly mammoth loving Vegan, not so competitive

Trio: FENG, LANDER, and CHURCH

I climbed a mountain but I'm still climbing--and there is so much left to see
 So much more to be, so much opportunity

LANDER

I'm Eric Lander and I teach at the Broad [*pr Brode*], an Institute at Harvard
 It's where all of these people studied the code
 They need to respect our legacy. At Harvard it's everything [*he stands next to Zheng*]
 We'll win the race East versus West--have you ever BEEN to Berkeley? It's a mess!

EMMA Not so fast, listen to me. I'm Emmanuel and big things are happening
 It's time for us women to take a stand, and decode this genome, this magic strand
 I'll soon meet Athena and to fame we will rise. Developing Science for a Nobel Pri
 The battle is on, the lines have been drawn. It's East versus West--6 paces. At dawn

ALL 4:

I climbed a mountain but I'm still climbing--and there is so much left to see
So much more to be, so much opportunity
One last mountain, we're still climbing--there is so much left to see
So much more to be, so much opportunity

One last mountain, we're still climbing--there is so much left to see
So much more to be, so much opportunity

*Ends with a marching beat, fading into a power chord of strings that blend into a wall of sound that will then
end with the end of Act 1*

approximately 54 minutes

--Intermission--

ACT II

The curtain rises and the setting is The Free Speech Movement Cafe in the Undergraduate Library Lobby of The University of California, Berkeley. Flash cards and hanging chads on flyers are pinned to a corkboard. The sound of espresso machines--bean grinding, milk foaming, and the familiar tap of discarded grounds fills the air as Jennifer, Aka Athena, walks in and introduces herself to a professor dressed in hippie-ish attire. Dr. Jillian Banfield, the Australian microbiologist who would introduce Dr. Doudna to the wonderful world of CRISPR.

JILLIAN *[stands up and talks in an excited, Australian accent]* You must be doctor Doudna?

JENNIFER Yes, and you must be Dr. Banfield

JILLIAN Well, to some. Call me Jillian. Thanks for meeting me for tea. This cafe is right between our offices! Who would have known that the leading scientist on RNA worked just down from the Campanile from me *[she takes out a few piles of papers and a little whiteboard with markers. Athena is amazed by this]*

JENNIFER Tell me more about this CRISPR. I'm fascinated!

JILLIAN Well, I've been seeing bacteria doing some amazing things--the DNA sequences Changing, adapting. I can't understand these CRISPR sequences--CRISPR being the Clustered Regularly Interspaced...

JENNIFER *[finishes the acronym, excitedly]* Short Palindromic Repeats

JILLIAN Yes! It's like this *[she draws a picture on the whiteboard she brought with her: an image of an oval to represent a cell of bacteria. She then draws a series of circles and diamonds to represent DNA.]* The repeating sequences isn't surprising--it's The precision of it--the perfection.

JENNIFER Why do you think these exist? What purpose does Nature have up her sleeve?

JILLIAN I don't know. Maybe simply to adapt quickly to any change the cell has to make in at any given moment.

JENNIFER [with a look of amazement--a chill running down her spine]. Changes... at any given moment...at ANY given moment! Do you realize what this means? Nature must be using this CRISPR--the chain--to adapt and to respond to challenges--say viruses. I heard of a Spanish Scientist, Mojica, finding sequences in different species of microorganisms, but those things lacked nuclei. But this? This could mean that cells...

JILLIAN [hands Jennifer one last sheet of paper]. This article, by a team at the National Institute of Health [as she wipes her fingers of mayo]--it's inconclusive but it suggests that RNA was a key ingredient in this. It's why I Googled you.

JENNIFER Can you believe what this could mean for Science? These mysteries of life, how bacteria have been able to adapt, to survive, it's fascinating. We can remember that this moment happened here, at THIS cafe that honors people like Mario Savio--people unafraid to share their ideas with the world.

JILLIAN I know. It's pretty amazing.

13. "Free Speech Movement Cafe"

JILLIAN It happened here, at the...

ENSEMBLE

Free Speech Movement Cafe--(4x total)

It happened here one blustery day--I just called you on the phone to say
That I thought you might be the one to know what this means
Why not in this place? Why not now? Our destiny --is what we allow
We were born to meet today and to change the world

JENNIFER

Just like Mario Savio did in 1961

let's make some noise, let's raise our voice, let's have some fun (Here at the...)

ENSEMBLE

Free Speech Movement Cafe--we have so much we want to say at the....

Free Speech Movement Cafe--

JENNIFER

People adapt to change--just like RNA--we see opportunity

It must be in our genes--no pun can ever take that away

I'll get a team together--I just have to find out more right away

It's the nature of disco very

There's so much more to do--but I'll do it anyway

Let's make some noise, let's raise our voice, let's have some fun--today (Here at the..).

ENSEMBLE

Free Speech Movement Cafe--let's change the world today...

Free Speech Movement Cafe--

Free Speech Movement Cafe--let's change the world today...

Free Speech Movement Cafe--*

*{*song should include an a capella and audience participation component of claps :}*

The stage projection simply reads "2011"

RACHEL I'm Rachel Haurwitz and where I fit into the story--like a protein into a strand of DNA--ok, maybe not [*laugh*] is that I was working on a protein called Cas 6 with Dr. Doudna in Berkeley. In my final year in her lab, she asked me what I wanted to do, and I said: "run a Biotech company." Well, I got my PhD. and Dr. Doudna and I started our own company called Caribou. We sought out to make CRISPR work to discover viruses. Being women, we had a hard time getting funding for our venture. Thanks to Berkeley, we got some help and advice--and the marriage of public education and private enterprise showed that our schools could do what was right to support research while realistically also supporting business. Heck, why lose us to corporations? Anyway, we got some more funding from the Gates Foundation (*cough*) and we were off to develop detention systems for hepatitis C,

HIV, and even for coronaviruses. In the spring, Dr. D took some time to attend a conference in Puerto Rico where another connection would change the world...

Jennifer, aka Athena, walks into a coffee shop where Emmanuelle Charpentier sits, sitting espresso and reading a scientific journal. The Dutch Scientist John van der Oost points out Dr. Charpentier who is well-dressed and cool just sitting in the cafe.

JENNIFER Dr. Charpentier, sorry to interrupt you, but I've read your paper in Nature. I'm Jennifer Doudna, from Berkeley.

EMMANUELE Pleasure to meet you [*in a French accent*].

JENNIFER Until your paper I didn't know that there was more than one molecule in CRISPR Pathways. This is thrilling because now we can think of CRISPR RNAs as potential Swiss Army Knives to fight viruses.

RACHEL [*re-enters downstage as Jennifer sits with Emmanuelle*]. Yet again, Dr. Doudna would find herself in a chance meeting with another great mind--in a serendipitous moment in which women in Biochemistry collaborate to make something big.

14. "Something Big"

[Jillian Banfield re-enters on the opposite side of the stage from Rachel--in the middle, Charpentier and Doudna freeze as Rachel begins to sing]

RACHEL
This friendship's something big, something meant to be
Bigger than the group of us--like Thelma & Louise
Let's put our heads together, and put our egos aside
Combining disciplines so wide like science and design

JILLIAN
We girls gotta stick together, make science priority
Not obsess on competition--so everyone can see

RACHEL & JILLIAN

We're makin' something big--something for all to see
 We're making something big--bigger than you and me
Em interlude [as Jennifer and Emmanuelle get up from their seats]

EMMANUELLE

You know that we can work together from far across the sea
 Making Science on our terms with no apology
 Take a note and watch us conquer like Marie Curie
 This is a brand new time for gender equality

All 3 WOMEN

We're makin' something big--something for all to see
 We're making something big--bigger than you and me

REPEAT

15. "The Rat Race" Reprise

ELDORA As Dr. Doudna's attorney with a Bachelor's Degree in Biology, I was excited to learn about CRISPR Cas9--idea of a protein that could cut DNA and insert a new sequence. The implications for science and the human race were limitless. But the race for this biotechnology had just begun.

[We see Dr. Doudna and Dr. Charpentier on one side of the stage. Working together in a Lab with other researchers, while Feng Zheng and others including Lander, work more frantically in their own lab. A ticking clock can be seen moving quickly as the narration continues]

While Dr. Doudna was working with the effective Cas 9 protein, Feng Zheng was experimenting with multiple proteins, trying to find the one that would work in human cells. Feng read the 2013 paper by Doudna on the subject and rushed to make it a footnote in his own study. Harvard versus Berkeley--East Coast versus West Coast--it became like a rap battle. Dr. D found herself having to pal up to the boys in Boston to try and make this science benefit all of them--but we all

know by now that Science...is a man's game. This had to change--and the West Coast needed to get some respect.

FENG

This research has to get done. I know that I'm the one to do it
I'll get my paper out, There will be no shadow of doubt

JENNIFER

This race is wearing me down--I feel like I'm always flying
Back and forth from Berkeley to Boston--I'm getting lost in this

CHURCH

I don't know what's gotten into Feng. It's like he's taking my work
I need to publish what's mine--and do it in the nick of time

LANDER

I'll write an essay called "The Heroes of CRISPR"--and put Harvard in the lead
I'll give my boy Feng the credit, and leave Berkeley in the weed(s).
In the rat race...

ELDORA Feng would win a patent for the biotechnology in 2017, and that would be upheld in Jennifer's appeal of 2018--but she hadn't hired ME yet. In 2019, I argued for Jennifer and Emmanuelle's patent as applying the CRISPR Cas 9 system for ALL organisms--as it was designed to do: for plants, for human cells, for food (good GMOs--trust me, those exist). [*She takes a bite of an apple*]. In the end, everybody wins--and a lot of people got rich--sharing the patent so that many private companies and universities could use biotechnology to help the human race. But Jennifer was worried about the potential of this science to bring harm to the world--so much so, that she had a nightmare...

16. "The Nightmare"

The set is awash in white light and Jennifer is in a white nightgown. She walks toward a man in front of a door.

THE MAN Dr. Doudna, I would like for you to meet someone who wants to know more about CRISPR Cas 9 to make the world better--more "perfect" as he says...

Jennifer

Do I dare open the door to a world that frightens me

I know someone's there on the other side who wants to meet me

But if I break down and don't stand up to these men who want to use me

Will I just be just as bad as them

I must have a plan

[A dance break features a small group of dancers interpreting the nightmare as a struggle in different directions, the nightmare-Doudna being pulled in different directions and tormented by the horrors of what her science could bring about: mutations, eugenics, Aryan support]

The nightmare-Doudna will then approach the door as the other dancers let go of her. She opens it as the music slows back down. Behind the door is a seated figure with his back (and the chair back) to the dancer). As the music stops, Jennifer asks...}

JENNIFER What do you want from me?!

{The figure stays seated but turns his head suddenly to reveal the face of a pig (mask). He stands and is clearly wearing a Nazi uniform and the mask has the trademark mustache of Hitler}

PIG HITLER I want to learn more about what you have developed.

The lights cut to black and Jennifer is now up in bed. She shakes Jamie awake from beside her

JENNIFER Jamie! Wake up

JAMIE What is it, honey?

JENNIFER A nightmare--a terrible nightmare.

JAMIE What was it?

JENNIFER Hitler, Jamie. It was awful. He wanted to know more about the science we're working on. I'm worried.

JAMIE Oh honey. It's ok.

JENNIFER I know this science can help people but I also worry that we have created a Frankenstein's monster

JAMIE No [he tries to reassure her]. You can only control your part, be a model for good. It's all any of us can be. In the face of evil. We can only shine as bright as possible.

JENNIFER I know.

17. "Double Helix" Reprise

JAMIE
Living our lives in the double helix, with all that we can be
You've shown me love and what science brings us
Such goodness and beauty

BOTH
Cuz when I stop and think about you--and all the life that lies within you--
there's nothing else for me left to do--but try to find my way right back through
To you

They embrace as the lights fade out

18. "We Make The Chain"

ELDORA Dr. Doudna still wrestles with the issue of Bioethics and has been a pioneer in that field. She's a watchdog, and wants to protect life and use Science only to help others. But ultimately that may be up to you, as you, the young people of today, become the next wave of thinkers, coders, lawyers [*signals herself*], and scientists.

Every morning we make the chain
The love we share is never in vain

For law and science we cannot contain ourselves
In this life there's no one to blame

In nature--survival is the name of the game
And what Athena's makin'--this world will never be the same

Do you realize that what they've done
Can truly benefit everyone?
Closing gaps of racial disparity
Makin' viruses a rarity

And in the end it's up to me & you
Just like your mentors taught you to
You have a responsibility
To treat our planet ethically, cuz

ENSEMBLE

Every morning we make the chain
The love we share is never in vain
For law and science we cannot contain ourselves
In this life there's no one to blame
In nature--survival is the name of the game
And what Athena's makin'--this world will never be the same

RACHEL

Every morning we make the chain
The work we do is never in vain
To save the world we need to explore our cells

CRISPR works with RNA

To make the changes in our DNA
The implications will help us to save ourselves
This all important technology
Is already part of you and me

If you're vaccinated it's so clear to see
You're protected by Biology

And in the end it's up to us
To share Science and to discuss
What genes can do to help us all
To face disease and stand tall

ALL

Every morning we make the chain
The love we share is never in vain
Together we'll use Science to save ourselves

[The scene changes as a college aged ANDY--Jennifer and Jamie's son, walks with a backpack and CAL apparel through campus. He meets mom for lunch at the Free Speech Movement Cafe]

JENNIFER Andy, thanks for taking some time to meet me for lunch. How was
Environmental Science class today?

ANDY Good. Did you know that Leonardo DaVinci predicted climate change?

JENNIFER No. Tell me all about it.

ANDY So, some call him “the master of disaster” because... *{Andy’s voice trails off as he and Jennifer walk, mother and son, to the Cafe and they sit down. RACHEL narrates}*

RACHEL By the fall of 2020, Dr. Doudna was running the IGI in Berkeley and enjoying her teaching and research. Her son was studying Engineering at CAL and the patent race for CRISPR Cas 9 had made the biotechnology available for use in humans. Her work with Emmanuelle wrapped up for now, she focused on work and family

JENNIFER *Sings as her son eats lunch. Other characters will be isolated in various parts of the stage*

19. “Proud of You”

JENNIFER:

Building your life in front of my eyes, I see what you will be
Responsible and capable, you mean so much to me
Use the things you’ve learned about to do good in the world
And you will find your dreams will be unfurled
Cuz wherever you go and whatever you do, I am proud of you--I am proud of you

ROSALIND:

DNA became so clear, so wonderful to see
I now look down with pride and joy to see what you can be
This science you’ve developed here will change the future world
End suffering for so many people--we’ll see their flags unfurled
Wherever you go and whatever you do, I am proud of you--I am proud of you

ALL:

Wherever you go and whatever you do, I am proud of you--I am proud of you

MARTIN [from beyond]

Watching here from far beyond I’m closer than you know
In your eyes there’s no surprise, we’re joined by one long code *[gestures ala Deniro]*

Inspiring many, saving lives--sharing love about

Cuz that's the only thing this world's about
Wherever you go and whatever you do, I am proud of you--I am proud of you

ALL:

Wherever you go and whatever you do, I am proud of you--I am proud of you

[cast comes forward for the last two choruses]

ALL:

Wherever you go and whatever you do, I am proud of you--I am proud of you

Wherever you go and whatever you do, I am proud of you--I am proud of you

[the soloists return to the shadows. Jennifer stands alone on stage]

JENNIFER I was sound asleep when at 3am on October 9, 2020, I got a call from Sweden. I was in a hotel in Palo Alto (near that other school down there--the Farm? *[jokingly]*). It was from Sweden. I was in shock. Emmanuelle and I had WON the Nobel Prize in Chemistry for our work with CRISPR Cas9. Of the 184 Nobel Prize honorees since 1911, only five were women. The first was Marie Curie. *[Emmanuelle joins Jennifer on stage]*. We couldn't forget the work of Rosalind Franklin, who also paved the way for women of Science and for our work with genetics *{we see Rosalind take the other side of the stage}*. There is more work to be done--but that's where you come in *[break the 4th wall]*. We need more women in Science, and we need more of your minds at work with genetics--ethical genetics that can eradicate diseases.

20. "On the Verge"

JENNIFER

If we look to tomorrow, with hope and with care
 If we study the Science, we know all is there
 Then the future is brighter than how it might seem
 We can use our knowledge, to develop vaccines
 I don't want to be a doubter, I just want to be true
 We're on the verge of something...something new
 The mysteries of Nature Can show us the way
 We're on the Verge now We can change

EMMA

If we stop and admire, all that's within

FENG

If we study with wonder, we know we can win

JILLIAN

When we put our minds together, there's no limit to what we can do

JENNIFER

We look to the future, and that future is you
 I don't want to be a doubter, I just want to be true
 We're on the verge of something...something new
 The mysteries of Nature Can show us the way
 We're on the Verge now We can change

ENSEMBLE

"Ooh-oooh" as the chord progression continues

Repeat as needed with the audience encouraged to sing with the cast. [cast exits to both sides of the stage.

They return for bows as the music continues. Each cast member bows individually (Athena last) before the entire ensemble joins hands to bow as a chain. They then signal the band and the crew before exiting]

Act 2: 35 minute run-time

The end.

Total run time: (1 hr, 30 min.)