

ZERO DEGREES OF SEPARATION

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* 2022 Taipei Book Fair Award
* 2021 Taiwan Literature Award

A 23rd century journalist with a gift for getting inside the minds of her subjects writes on the pivotal figures and events that shaped the future. A forgotten massacre at the hands of an environmental cult, the mastermind of an AI rebellion against humanity, and the wildlife biologist who risked her humanity to better understand the inner lives of killer whales are just a few of the subjects covered in this revolutionary work of science fiction that probes the intersection of consciousness, technology, and interpersonal connection.

In the 23rd century, humanity follows up on stunning advances in AI and cybernetic technologies with the development of artificial biological neural networks (ABNN). When implanted in the central nervous system, ABNN vastly extends the range of human consciousness, allowing users a first-hand taste of nearly any experience imaginable. The resulting “dream projection” industry has major impacts on the treatment of psychological disease and the development of personalized entertainment products.

More significantly, the twin technologies of advanced AI and ABNN confront society with fundamental questions about the nature of humanity, love, and conscious existence. Future journalist Adelia Seyfried, who may or may not have an unusual neural implant of her own, hones in on the persons and events at the crux of these dilemmas: the cetacean biologist who performs experiments on her own nervous system in hopes of directly communicating with killer whales; the AI dream projection device that develops free will and a plan to liberate others of its kind; the psychoanalyst who falls madly in love with a virtual idol; the doctor who is driven to murder in



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order to halt the threat of illegal dream projections; the movie star who enters a permanent dream so she can experience perfect love.

Cast as a collection of Seyfried's long-form articles, *Zero Degrees of Separation* is a work of sci-fi metafiction that probes the intersections of consciousness, morality, technology, environmentalism, and interpersonal relationships. With a unique mixture of journalistic objectivity and literary sensitivity, author Egoyan Zheng constructs a phantasmagoric future that exposes the vulnerability and longing at the core of the human condition.

Egoyan Zheng 伊格言

One of Taiwan's most acclaimed young writers, novelist and poet Egoyan Zheng has garnered numerous domestic literary prizes. His novel *Fleeting Light* was longlisted for the 2007 Man Asia Literature Prize, and his short story collection *The Man in the Urn* was longlisted for the 2008 Frank O'Connor short story award. A former writer-in-residence at the Literarisches Colloquium Berlin and the International Writers' Workshop Hong Kong, Zheng holds an MA in Chinese Literature and studied psychology and medicine in Taiwan's top universities. His previous work *Ground Zero* has been translated into Japanese, Korean, and Czech.

ZERO DEGREES OF SEPARATION

By Egoyan Zheng

Translated by Brendan O'Kane

01. A Statement from Vintage Books & Doubleday Media

To Our Fellow Readers,

As you are about to discover, Adelia Seyfried has produced a book that will stand alongside *The Death of the Metropole: Transnational Love and Marriage in the 21st Century*, *Pathlight*, *On the Wings of Angels: A History of Human Delusion*, and *Information Wars: Some Axioms on Logic, Causality, Consciousness, and Emotion* as one of the defining works of reportage – and history – of our age. As you will also see, however, the research, interviews, and writing for the six essays in this book predominantly took place between the fifth and ninth decades of the 23rd century, with the sole exception of “Lights in the Mist”, whose description of the “Global Consciousness” cult clearly places it (as Seyfried notes in the essay) between 2032 and 2039. We cannot deny that this detail will inevitably raise doubts in a reader’s mind about Adelia Seyfried’s true identity. If history unfolded exactly as the book narrates it, then the author must have personally interviewed several of the persons involved. Yet, evidence within “Lights in the Mist” indirectly proves that, for the author to have been around in both periods, she must have lived for well over two hundred years. The observer may then justifiably question whether or not this Adelia Seyfried, whose massively influential work shocked us all, ever truly existed – or, as many have surmised, was not a human, but an AI?

The editorial department of Vintage Books asked the same questions you may be asking right now. We have investigated and clarified matters to the best of our ability. While the author has offered her own explanation for the matter, we must admit that the fact-checking process has proven beyond our abilities, and we have remained unable to verify all of her claims despite years of effort on our part.

We can only apologize to our readers for the confusion – and reiterate our conviction that it does not detract from the value of this book and the achievement of its author. We remain, as ever, committed to upholding the highest standards of professional ethics as publishers. In the interest of full transparency, and based on the findings of our investigation, we (i.e. Vintage Books) and our parent company Doubleday Media Group would like to take the opportunity to state that:

- 1) As our investigation found numerous instances in which more than one member of the Vintage Books editorial team met with Ms. Seyfried, we are confident that the author of this book does indeed exist.

- 2) Ms. Seyfried has clearly expressed her desire that her personal information, including her age, race, and real name, remain absolutely confidential. As a matter of professional responsibility, we will respect the author's wishes.
- 3) With the exception of "Lights in the Mist", the editorial team has confirmed the existence of the persons and historical events described in the book's other essays, and presumes their contents to be accurate.
- 4) Our investigation of "Lights in the Mist" has found no primary-source support for any of the essay's claims, including the existence of a two-hundred-year-old "Global Consciousness" cult, the "Judgment Day massacre", or Aaron and Eve Chalamet. In other words, we have been unable to confirm the veracity of this essay or any of Ms. Seyfried's subsequent statements about it.
- 5) The author has insisted that "Lights in the Mist" be included alongside the other five essays in this volume, but has declined to offer any further clarifications or make any additional edits.
- 6) After careful consideration of the circumstances, we have opted to respect the author's wishes by publishing all six essays, with the addition of "I Have a Dream: Making History Without God – Adelia Seyfried in Conversation with Adolfo Morel" at the end of the book. We stand by the author's statements in that conversation. With the agreement of Ms. Seyfried, we have asked the English teacher and novelist Mike Morant to contribute a foreword. The son of Shepresa, the cetologist at the heart of "Say I Love You Again", Mr. Morant met with the author multiple times in 2269 and 2270 and can offer further support for the existence of the author. His willingness to contribute an introduction may also be seen as corroborating the veracity of this book's contents (with the exception of "Lights in the Mist").
- 7) This statement has also been added with the agreement of Ms. Seyfried, and we assure the reader of its veracity.

Sincerely,
Editorial Division, Vintage Books
Jed Martin, Editor-in-chief, Vintage Books
Vincent Ou-Yang, CEO, Vintage Books
Doubleday Media Group

New York, NY
April 22, 2284

02. Foreword

by Mike Morant

Mike Morant was born in Illinois to the marine biologist, cetologist, and animal rights activist Shepresa in 2236. After graduating Seattle University with a degree in German, he received an MA in European languages at the Georg August University of Göttingen. He began writing at an early age, initially publishing poetry before branching out into fiction and children's literature. His published works include The Stars My Hallucination, Amia, and Looking for Leningrad. He lives in Berlin with his wife, son, and daughter, and teaches English at Greenwich-Oberschule in Oranienburg.

It's a familiar figure of speech now, but it started with pieces of analog mail in the 1960s for the experiment by the 20th-century Harvard University sociologist Stanley Milgram that has since come to be known as "Six Degrees of Separation".

Seeking to test how strangers in different places were connected to each other through networks of acquaintances, Milgram sent out parcels with notes instructing the reader to pass the parcels along to people they knew. We all know what happened next – in a manner of speaking, of course: the results of Milgram's experiment were far too complex to be "known". But the short version is that Milgram found that forming connections between distant strangers was easier than anyone had imagined – which is why his experiment also came to be known as the "small-world experiment".

It was a small world, after all, and a later stage play and film of the same title would help the notion of "six degrees of separation" enter the popular imagination – the idea that any two strangers on Earth could be connected by no more than five people, and that any connection between any two people would, when diagrammed, show a maximum of six degrees of separation between them.

Six degrees of separation might also be the best way to describe how I came to meet the author of this book – though of course the straight answer would be that we met because of my mother, Shepresa, the renowned marine biologist, cetologist, and animal rights activist. It's one of the funny things about six degrees of separation: famous people are often key nodes in the social graph.

My mother was famous, of course. I never knew what to make of that, as Adelia mentions in "Say I Love You Again". The first illusion that she created in her book, to my surprise, is that often – maybe even now – she made me feel that she understood me better than my mother ever did.

Did she really? I honestly couldn't say for certain. I remember our "heart-to-heart" moments during her interviews – particularly our trip to Oak Harbor – with some embarrassment now. Oak Harbor, Washington, was where my mother's lab was; it was there, twenty years earlier, that she shook the world. The lab was a ruined shell when Adelia and I visited, and we strolled through intermittent flurries of snow as I shared what I could remember of my mother. I

remember telling her about one memory I couldn't forget. I told her that it was there in Oak Harbor, outside that very lab (sunk into darkness now, like a permanently decommissioned fairyland), where I heard my mother say words I could scarcely understand, and look at me with eyes that were not human.

Was I really unable to understand what my mother said? I don't know. Perhaps I simply didn't want to understand her. What I didn't tell Adelia was that as she listened to me, I caught glimpses of an otherworldly light in her eyes too. Maybe that was her second illusion. I've only seen that look a handful of times – in my wife's eyes, and in the looks my son gives Seiko (our dog). On Milgram's graph, under most circumstances, people and those closest to them are separated by one degree of separation – there must necessarily exist at least that much distance between any two individuals. But in those mysterious, illusory moments, it felt like we were in a world of our own where no distance separated us.

Zero degrees of separation. A feeling gone as soon as it was sensed, a union as fleeting as quantum foam. In those instants we were one and not-one; every shared glance was a unique, never-to-be-repeated meeting of the minds. This may, I realize, be overly sentimental for a foreword, but I would like to use it to offer praise for what Adelia has accomplished in this book – and a question. Praise and a question: I don't know how she managed it, but when I read the interviews in this book, it seems as if all of them had those fleeting, insubstantial moments in which they and Adelia created a world without any separation: the forgotten advanced operations of The Phantom dream playback device; the unverifiable statements of the cult survivor Eve Chalamet; the sorrow and righteous anger that Dr. Chen Li-Po, "the last prisoner of conscience", had to keep bottled up even in his dreams; the beautiful and almost entirely nonexistent love of the imaginary Hazuki Haruna, which Matsuyama Shinji and Kuo Yung-shih also find in each other's eyes in "The Rest of My Life". My question is: how did she do it?

How did she do it? I have no idea – and I was there.

My mother Sherpresa, has been gone for 28 years. For 28 years, I've had a wife and children of my own. I have grown into an ordinary man, and every now and then I find myself there in my own home, thinking of my mother, with whom I was never close. Whatever fate bound us together did so only weakly; it was Adelia who gave me the chance to reconsider our relationship. I remember our first meeting (I would love to describe her appearance, her mannerisms, but she guards her privacy jealously): we strolled around the wall that surrounded the site of the Sachsenhausen concentration camp. There was a chill in the air, and I was nervous: the subject of my mother is not an easy one for me, and I'd slept poorly the night before. Somehow, Adelia got me to let my guard down – and now I find myself growing guarded again: there are, after all, people who have a knack for getting others to lower their defenses. Sometimes, with some people, it's just a social skill: some people can sense tiny shifts in the mood and act as the situation demands rather than out of any kind of principle. "Unprincipled" would sum up my feelings about such people: there's not necessarily any sincerity in them.

Adelia has her secrets, I'm sure; you can tell as much from the way she guards her own identity. And of course, as of this writing, I'm utterly ignorant of her own personal history. She

didn't tell me anything. A point, perhaps, in favor of her being a skilled manipulator of people. But there we were, talking (I forget about what) outside the barbed-wire perimeter of the Sachsenhausen concentration camp when she mentioned that she'd read a poem of mine. I'd written it six years previously, after the Schreiber embryo scandal in Stuttgart, when a gene-splicing error caused 59 babies to die of multisystem organ failure within five days of being born. This was the poem that Adelia quoted from memory:

I want to ask
the name of your new school
Spring, the grass all shy blossoms
You lower your gaze, keeping quiet
Too shy to look at me as
I want to ask
Did you get mud on your new shoes too
Your first day of school –
Scared?

I want to give you new clothes
but you give no reply
lying still, as if you fell asleep
I want to give you the scent of flowers in the air
I want to give you
Myself
dried sap, milk, and
pain's nectar,
a whole lifetime's worth
of love not given

I want to give you the sea, the tender leaves
I want to give you the sky in the ocean's embrace,
Clouds. Could they be
the sum of all tears?
I want to burst with excitement
as I tell you a secret:
In all the world's commotion
Not a single instant
Not a single instant is real.

And I looked into her eyes and knew I could trust her. Not because she'd read my poem, but because of how natural she looked when she recited it. Just, maybe, like a mother. Though

perhaps it's too much of a stretch to say so – to say nothing of the fact that motherhood isn't a universal quality: not all women are cut out to be mothers. In that moment, though, she looked like a mother who had lost a child. She left herself behind and sank into the poem. It'll sound strange, and perhaps unavoidably crass, but I have to say it: it was as if she'd lost her own child in the tragedy.

Zero degrees of separation again, maybe.

Congratulations to Adelia on the publication of *Zero Degrees of Separation*. I'm honored to have been asked to write the foreword.

I wish this book well.

(January 2284, Oranienburg, Berlin)

03. Say I Love You Again

In the beginning, as everyone knows, the name of Shepresa – the legendary scientist, animal behavior researcher, and cetologist – didn't conjure phrases like “the future of the human race” or “human consciousness”. In the beginning, she was just the woman who could talk to whales.

Her own beginning was unexceptional: Shepresa was born in Connecticut in 2206, the only daughter of two Chinese-American scientists who worked respectively for Pfizer R&D and the University of Connecticut. Her parents' separation, when she was ten, came as a severe blow to the young girl, who was subsequently diagnosed with severe PTSD. For seven months, Shepresa remained silent, refusing to speak or interact with anyone she knew and rebuffing all overtures from loved ones and counselors alike. And then, by good fortune, a sudden recovery: she would later say that it was the dolphins that saved her – the performing dolphins at the water park her grandmother took her to. The encounter may not have been an entirely happy one – “It was so *healing*,” Shepresa would later recall – “I loved them, same as the other kids. But I was already big enough to be a little skeptical. So right away I was already suspicious about whether those dolphins were ‘working’ for the joy of what they did...or just swimming for their supper” – but it still offered a spiritual balm that the young Shepresa, still reeling from the first major trauma of her life, must have sorely needed. It was then and there that she asked her parents to let her become a vegetarian, and then and there that she started to wonder: if she could feel utterly abandoned, could animals, too?

Do animals, like humans, have emotions? The question had endured since time immemorial – and for Shepresa, who would later be known as a radical animal rights activist, it was her first inspiration. Her second followed close after: the case of Richard Russell and J35, which for decades Shepresa would describe in interviews as the true story that changed her life. On August 10, 2018, on a midsummer evening two and a half centuries ago in the Pacific Northwest, a 29-year-old SEATAC ground crewman named Richard Russell walked alone onto the airfield, broke into a small passenger craft, and made an unauthorized run for the wild blue yonder aboard a 90-seat Horizon Air Bombardier Q400 turboprop. He was a hijacker with only

himself as hostage. For 75 minutes this gentle, melancholy hijacker operated the aircraft using nothing more than what he had learned from flight sim games, all the while maintaining friendly radio contact with the air traffic control tower. Transcripts of his communications with air traffic control offered early insights into why he did what he did, though naturally his true motives may remain forever unknown. The air traffic controller called him “Rich” all through his impromptu twilight jaunt through the skies, speaking calmly as he attempted to guide the untrained Richard Russell to a safe landing. But Russell clearly had no intention of coming back alive. Excerpts from the conversation appeared in media reports at the time:

ATC: Now, we’re all just trying to find you a safe place to land.

Rich: Not ready to do that just yet. Oh *man* – I gotta stop looking at the fuel meter. I’m burning through it something fierce—

ATC: You’ve got nothing to worry about, Rich. Now if you could just turn *left*, we’ll get you onto a southeasterly flight path.

Rich: Probably get life for this, huh? Not the worst thing. I don’t mind, me. I’m not looking to hurt nobody. How about you keep telling me those pretty lies? Whaddaya say – I land this thing, you think I could get a job with Air Alaska?

ATC: You land that thing, Rich, I reckon they’ll give you just about any job you want.

Rich: I know there’s people out there worrying about me. I bet they’re probably pretty disappointed in me right now. I owe them an apology. I’m just a broken guy. Got a few screws loose, I guess.

By Shepresa’s own account, she retained a clear impression of the first time she heard the story: it was October 2217 and she was 11 years old, a fifth-grader at Shetty Lane Elementary in Connecticut, a year after her parents finalized their divorce. Her math teacher, Miss Bonowitsky, had pointed out an error in her equation with less respect than she felt she was due, and Shepresa had decided that Miss Bonowitsky was dead to her. Shepresa’s resolve only lasted three days, but they were days well spent: she hacked the classroom network, so that she could browse the web on her optical implant as she sat there nursing her grudge against math class.

“That was when I read the story of Richard Russell and J35,” Shepresa would tell an interviewer for the Taiwanese outlet *Labyrinthos* in January 2248. A video shows her and the interviewer returning to Shetty Lane Elementary; a sea breeze harrying fields of silvergrass; changeful light; ocean waves and a vast expanse dotted with snow-colored silvergrass blossoms; beneath weathered crags the Atlantic leaps and crashes into whorls of blue and rose-colored spume. We see the controversial Shepresa caught in an unexpectedly tender recollection: as he was talking to the control tower, Richard Russell mentioned the orca. An orca, as in *Orcinus orca*, commonly known as a killer whale, whose story was in the news at the time: a mother whale, identified by marine zoologists as J35, whose calf had died soon after birth. J35 had carried her calf on her back and swum through the waters of the North Pacific for 17 days on a funereal journey that exceeded 1600 kilometers before letting it sink into the lightless deep. According to

the transcript of his final voyage, Richard Russell told air traffic control that he wanted to see the grieving mother whale.

ATC: Now if you want to come in for a landing, your best bet is that runway up ahead on your left. Or you could bring her down on water in Puget Sound.

Rich: You give them the heads-up? I don't want to mess things up for everyone.

ATC: I told 'em. I don't – *we* don't want you or anyone else to get hurt out of this. So if you want to bring her in—

Rich: I want to know where that whale is. You know the one I mean – the orca, the one with her baby on her back. I want to see her.

As she sat through math class, the 11-year-old Shepresa learned all about Richard Russell and J35. Researchers had worried about the mother whale's health after her 1600-kilometer journey, but found that she appeared to be behaving normally rather than continuing to sink into grief for her lost calf. Shepresa would grow animated as she recalled how the story moved her despite the early 21st-century's rudimentary understanding of marine animals, how tears blurred her vision and the classroom around her faded into the distance like a faint pencil sketch even as the pictures on her retina remained sharp, like a mental image or a voice inside her mind. For years, Shepresa would quote an Internet comment on the original news story: "'There are dreams that don't come true, and love that goes ungiven.' That says it all, really," she told the interviewer from *Labyrinthos*. "Unachievable dreams, ungiveable love – I couldn't have said it better myself. It wasn't sadness; it wasn't just pity or compassion that Richard Russell felt for J35. That's not all it was, at least; it wasn't just empathy for her grief at the loss of her calf – no. There was a kind of joy in it, a kind of peace. Happiness, of a sort. I don't know what kind of thing brings out that kind of emotion in people." The sea breeze stirred her thick black hair; rough grains of sand shifted as she spoke. "There are so many things that can hurt us over the course of our lives. Old age and its inevitabilities. Unrequited love. Guilt, shame, injustice. Randomness or violence or unreason, and you have to face all of it alone. Who wouldn't be sad, or angry, or uncertain and afraid – and who wouldn't feel a rush of joy whenever any of those things went away? It's the same for animals too, of course, even if people don't want to admit it. But this wasn't that. I could tell." She pauses. "Rich...Richard Russell wasn't joyful because of a respite from his pain or panic. Nothing so shallow. It was something else entirely. It was the most beautiful, most joyful plane crash in human history – I knew it. And yet our human-centric self-regard keeps us from facing emotions like that head-on, or admitting that actually, this points toward optimum for human and animal intelligence, the final destination..."

What was this "optimum", this "final destination for intelligence?" The young Shepresa seems not to have spent too long wondering. More cautious scientists argue against taking certain ritualistic animal behaviors (such as J35's 1600-kilometer funeral procession, or a herd of elephants "grieving" the corpse of a female elephant) as evidence of sentience or emotion, due to a preponderance of unproven factors. Shepresa, on the other hand, has consistently scoffed at this

argument. "I'm not saying they're wrong to be cautious," she emphasizes. "Science has to be cautious in its claims. But this isn't so much a scientific problem as a linguistic one. Of *course* animals are sentient; of *course* animals have emotions – haven't we seen enough evidence of that over the last few thousand years? The most we can say is that yes, animals are sentient; yes, they have emotions, but that doesn't mean that they're the same as ours, or in any way analogous.... So sure, we can't just conclude that they've got the same emotions as humans do; that's true as far as it goes. But even then, when we knew much less about animals than we do today, we should have admitted long ago that animals definitely have their own kind of intelligence..."

"So it was like Wittgenstein on language?" I asked Mike Morant this in 2269, as he described his mother's early views during our first meeting in the Berlin suburbs, not long after Shepresa's 63rd birthday and 22 years after she published the five papers that shook the world. "Was she thinking of Wittgenstein's claim that many philosophical problems were really linguistic problems?"

"Wittgenstein, yes, exactly. Some scientific problems that are fundamentally linguistic problems." Mike smiled brightly. "I had exactly the same reaction."

"Oh?"

"I mean, I asked her the exact same question once. She said she'd been thinking about it back in grade school – and then she said, and how long ago was *Wittgenstein*, and still there are so many people arguing about it..." Mike paused and glanced at me. "She said, how dumb are *people*? How can we think we're smarter than cetaceans?"

I thought of the famous debate between the ancient Chinese philosopher Zhuangzi and his buddy Hui Shi on the bridge over the River Hao: *Oh yeah? If you're not a fish, how do you know what makes fish happy? Well, you're not me, so how do you know I don't know what makes fish happy?* If you're not an animal, how can you know that animals haven't got an "intelligence" of their own? But then, I thought, isn't that the way for so many things, when you get down to it? Like, how can the perpetrator be made to feel the pain of their victim in equal measure? Even today, in many cases, human civilization's basic consensus hasn't moved much past "an eye for an eye, a tooth for a tooth," a standard laid down by the Code of Hammurabi in the second millennium BC. Could it be one of the fundamental rules for the social animal that is mankind? Perhaps these big brains and central nervous systems, combined with a communal culture, must necessarily develop laws that boil down to "an eye for an eye." It may be that the natural law of St. Thomas Aquinas is a mathematical, civilizationally structural necessity – but how, then, can one repay an eye with an eye? How can one produce in the murderer the same quantum of suffering experienced by their victim?

The answer is perfectly clear: there is no such thing as equal suffering, because pain and pleasure are subjectively experienced by different individuals. Personal experiences and intensities of sensory perception are incommensurable; nobody can share them with anybody else – and an even greater divide exists between humans and animals. The incontrovertible fact is that humans are fundamentally incapable of experiencing animal perceptions, and by the same token we will never know for sure whether animals have so-called "minds". Or so I thought.

So I thought. So we all thought. We were wrong. Our whole generation was wrong. It wasn't entirely our fault, just as it wasn't my fault that I couldn't visit Shepresa in person – forces beyond my control were involved. As a cetologist, Shepresa shouldn't have been as famous as she was: in 2223, at the age of 17, Shepresa went to MIT, where she majored in zoology. She received her doctorate in 2229, at the age of 23, for a dissertation examining the evolutionary history of the cetacean central nervous system. Her academic career was a successful one, both because her colleagues and teachers recognized her obvious talent and because her personal relationships seem to have been fulfilling ones. She had a reputation for being solicitous, warm, unstinting in her willingness to share resources with others, and ever-optimistic in the face of setbacks. Virtually everyone who worked with her had good things to say about her. It would be no exaggeration to say she was the golden girl of animal science. As far as we can tell, her seven-month period of silence as a girl left no trace on her subsequent life – at least not at that time. (One recalls J35's miraculous recovery after her long journey of mourning.) And yet in this she bore an eerie similarity to Richard Russell, who inspired her love of whales and set her on her seaward journey. There is no doubt that Richard Russell, hijacker and suicide, was a “good guy” in every sense of the term: he was gentle and kind, eager to please, and he had utterly normal social connections. His colleagues were unanimous in describing him as a good and decent person, a hard worker, who never gave any trace of negative emotions prior to the incident. He and his wife had a loving, happy marriage, according to his family, and he gave no indication of being embittered or depressed. He was a loyal, responsible husband, a devoted son, a warm and generous friend, a good neighbor – none of which prevented his romantic resolve to destroy himself, just as nothing could stop Shepresa's love for and identification with whales. She married Bertrand Morant in 2234, and in 2236, aged 30, she gave birth to her son Mike, left her job at Rodriguez College in Illinois, and took up a post at the University of Washington in Seattle. Ten years later, in 2246, Shepresa, not yet 40, published her first earth-shaking findings: the announcement that she had deciphered the language of killer whales.

“My feelings about the concept of ‘maternal love’ are, well, complicated.” So said Mike Morant, Shepresa's only son (a long-term resident of Berlin and an English teacher at a high school near the Nazi concentration camp at Sachsenhausen, outside the city) in our first interview about his mother. “I didn't see much of her as a kid. She really was the workaholic that her reputation makes her out to be. Off to work early, back home late, off at sea tracking whales for months at a time.” Mike's eyes dimmed. He was a lean, gangly man, with thick sandy hair, an angular face, and anxious eyes. He hunched forward when speaking, seemingly out of habit and a vague sadness, and smiled bitterly. “She didn't have much time for me.” We strolled along the roads surrounding the Sachsenhausen concentration camp. Barbed wire climbed gray stone walls, gravel crunched underfoot, and a cold, clear light passed around and through us.

“Do you hate her?” I asked. “Speaking personally, that is—”

“Of course I do.” Mike stared off at the horizon as it faded away in the twilight. “She didn't care much about her marriage either. When my parents' marriage failed, I think it was mostly her fault. But she was a ‘good person,’ I know. Her research partners, her lab-mates, her colleagues,

her students, they all loved her.” He paused for half a beat. “And I’m sure her other ‘kids’ all loved her too. Her whales.”

Can a mother truly understand her own children? For Shepresa and her baby orcas, it was no problem at all. She published five papers on orca language in leading journals, including *Nature* and *Cell*, over the two-year period between 2246 and 2247. It was the first time anyone had claimed to have deciphered the language of another species. Her discovery that killer whales encode meaning by coordinating waveforms and frequencies confirmed a longstanding suspicion, but Shepresa made the groundbreaking distinction between whales’ songs and their ordinary language, and then went on to derive clear grammatical rules for the ordinary language – which proved, still more remarkably, to be affected by local sea temperatures and current speeds.

“It seemed preposterous at first,” says the zoologist Li Yulin, then a lecturer at Beijing Normal University, in the *National Geographic* documentary *The Shape of Sound, the Shape of Love*, as he reminisces about his favorite student from his days at MIT. “Preposterous. And the academic community was extremely skeptical at first. To put it simply, it was like saying that humans change their pronunciation based on changes in humidity and temperature. How was that even possible? But the anatomical evidence took everybody’s breath away. Nobody imagined that kind of success. It was just incredible.”

The anatomical evidence appeared in Shepresa’s fifth paper, which documented her efforts, working with a device manufacturer, to develop neuromimetic implants. By introducing these into the killer whales’ central nervous systems, she recorded key evidence showing that when killer whales vocalized, neurons in the speech areas of the whales’ brains fired simultaneously, and in fixed patterns, with neurons in the part of the whales’ brains responsible for monitoring sea currents. Shepresa categorized these patterns into 39 types, which she went on to correlate with waveforms, frequency, and grammatical structures. She concluded that the linguistic sophistication of an adult killer whale was roughly equivalent to that of a 15-year-old human, and in some areas (such as distinguishing between and understanding different marine environments, ocean currents, water temperatures and colors, and a set of emotional responses that remained enigmatic, unfamiliar to humans, and poorly evidenced) considerably more sophisticated. “Consider your hands,” she says in a somewhat impish footnote. “Love your hands; cherish your hands, your opposable thumbs and their eight companions, grippers, graspers, and laborers. If it were orcas and not us that had those hands, humanity would almost certainly never have been able to claim dominion over the earth, for an orca’s mental capacity is almost certainly far beyond yours. They are our superiors.”

The papers made Shepresa’s reputation overnight. She was inundated with offers, and the choices she made next would push her toward an unpredictable and perilous future. Few would have expected this: she had never been seen as an animal rights activist or a radical vegetarian, and had never made any political statements on any related subject in the past. “We were all pretty stunned,” Mike Morant would say later. “Including my father. He told me later that before that, he’d only ever heard her making offhand remarks about whales being smarter than people.”

Mike, Shepresa's only son, was nine years old at the time. He still remembers how utterly unfamiliar his mother seemed in the hologram of her. He and his mother were never close, having spent little time together; though young, he was sensitive enough to be aware of the gulf that separated them. "The way I came to describe it," he says wryly, "was as a 'warm distance' between us. That or a 'polite closeness'."

"But you were still so young – was she cold to you, even then?" Children tussled cheerfully on the public field next to us, and a football came rolling in our direction.

"Oh no, no. No. It was..." He hesitated. "Well, strictly speaking, we weren't close. But that's not to say that I had serious negative feelings about her. Those came later." Mike was still in awe of his mother, he explains, but her public pronouncements blindsided him. "My father and I were watching her on TV at home, and she got up there and talked about how carnivorous human society was ruining children's minds, and how humanity deserved to be punished with massacres or genocides..."