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CHAPTER 10

Unorthodox Theories and Beings

Science, Technology, and Women in the Narratives of Rosa Montero

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Rosa Montero's publications might be read as a barometer of key issues in Spain since the nation's transition to democracy, and several of her novels engage directly with the central concerns of this collection, namely the involvement, marginalization, and exclusion of women in STEM fields. Spain's gender equality law (*Ley de Igualdad*, 2007) and various initiatives to augment equity in the workplace may improve women's opportunities in sciences, math, engineering, and technology, and yet invisible barriers continue to impede equivalent participation (Osca Lluch 7, 13). While the following numbers are just one measure, men produced 73 percent and women 22 percent of the total science and technology publications in Spain from 1999 to 2008, and women's production grew from 21 percent in 1999 to 31 percent in 2008 (Osca Lluch 30–31). Making visible gender asymmetry and women's contributions and challenges in STEM is a strategy that feminists have employed to protest inequity and create

greater opportunities and recognition. This essay analyzes Montero's representation of female figures connected to science and technology in the narratives *Instrucciones para salvar el mundo* (2008; Instructions to save the world), *Lágrimas en la lluvia* (2011; *Tears in Rain*, 2012), *La ridícula idea de no volver a verte* (2013; The ridiculous idea of never seeing you again), and *El peso del corazón* (2015; *Weight of the Heart*, 2016).[1]

Unorthodox scientific theories and genres in these texts call attention to the non-normative place of women in STEM fields—their imposed absences, invisibilities, and relegation to the sidelines of scientific work—yet also their persistence despite substantial obstacles. Montero's portrayals of women in or associated with the sciences and technology also suggest an imperative to understand the individual self within a broader ecological co-dependence that encompasses human and non-human life. This study will begin with a brief overview of the four novels and analyze how they represent the exclusion and marginalization of women in STEM. Next, it will address how Montero offers unorthodox scientific theories and textual strategies to highlight women's ostracism and their challenges to norms in these fields. Finally, the study will analyze how Montero's works construct community for women in STEM. These works blend the humanities and sciences to bring critical perspective to discoveries and innovations in the past, present, and future, suggesting the need to weigh positive and negative consequences not only for humans but for all life forms.

Exclusion and Marginalization of Women in STEM

Instrucciones para salvar el mundo, *La ridícula idea de no volver a verte*, and *El peso del corazón* all include female scientist characters while *Lágrimas en la lluvia* and *El peso del corazón* feature a technohuman protagonist that embodies bioengineering. Most of the women associated with science in these works experience exclusion from scientific, professional, or social communities. These novels take place in or reference a range of time periods, places, and socio-political contexts—from the turn of the twentieth century in Paris (*La rídicula idea*) to the contemporary era in Spain (*Instrucciones* and *La ridícula idea*), and one hundred years into the future in a globalized world that extends beyond planet Earth (*Lágrimas* and *El peso*). When considered together, these novels suggest the enduring ostracism of women in STEM, along with their continued resolve and insistence of their place in these fields.

LA RIDÍCULA IDEA DE NO VOLVER A VERTE

In *La rídicula idea de no volver a verte,* Montero reflects on Marie Curie's professional achievements and personal life, and she considers the premature death of Curie's husband and research partner Pierre in relation to the loss of her husband and fellow journalist, Pablo Lizcano, to cancer in 2009. Prompted by Seix Barral editor Elena Ramírez's request that Montero write a prologue to the twenty-page diary that Curie composed and addressed to Pierre following his death, Montero contemplates not only Marie Curie but also societal gender expectations, women in the sciences, and writing to process mourning. Montero's emphasis on parallels between her own life and Curie's makes patent the transferability of this early twentieth-century woman's experiences to the twenty-first century and beyond. Through making this connection, the narrative suggests that foremothers support and inspire today's women, who like their predecessors, face gender discrimination and obstacles to studying and working in STEM.

The narrative emphasizes the formidable magnitude of Marie Curie's accomplishments in their own right and their amplification in the context of her gender and times. Curie formed part of a small group of scientists who predicted the instability of atoms, which challenged Newtonian theory and linked without precedent the fields of chemistry and physics (*La rídicula* 106). As Montero's narration states, Curie is the first woman to win a Nobel Prize, the first person to win two, first in physics in 1903 with her husband Pierre and then in chemistry in 1911 on her own, one of only three people ever to win two Nobels, and one of two to win in two different fields. Moreover, very few women have become Nobel Laureates in the sciences, with only six total in chemistry and three in physics, including Curie: "O sea que Madame Curie permanece imbatible" (11; In other words Marie Curie remains unbeatable).[2] The narrator emphasizes that Curie's notable scientific accomplishments are even more astounding in the pre-twentieth century European environment that restricted middle-class women to the home, employment as teachers or ladies in waiting, or "las tres ocupaciones tradicionales: monja, puta o viuda" (55; the three traditional professions: nun, prostitute, or widow). Before studying at the Sorbonne, Marie worked in Poland as a teacher; nonetheless, her exercise of this traditional female profession broke with socio-political norms, for she created a clandestine school to teach farmers Polish, a language the Russians had prohibited. Drawing on biographies and Curie's diary, the narrator surmises that Curie's childhood living under Russian occupation

contributed to her revolutionary character and her atypical future.[3]

As a female scientist, Curie faced disdain from colleagues despite her achievements. Four male scientists who nominated Pierre Curie and lab partner Henri Becquerel for the Nobel for the discovery of polonium and radium omitted Marie. At Pierre's insistence, she was included, but she and Pierre received a monetary award for one person, as if she did not count, rather than the customary award for each winner. Only Pierre accepted the prize on stage, though he attributed full credit to Marie. Such lack of public recognition discourages women from pursuing work in so-called male fields and causes self-doubt about their abilities. After Pierre's death, when Marie first taught his classes, she directed a remark to Pierre in her diary about the need to prove that the classroom and research lab were her places too: "quizás sea también el deseo de demostrar al mundo y sobre todo a mí misma que aquella a quien tú amaste realmente valía algo" (149; perhaps it is also the desire to show the world and above all myself that the one whom you loved really was worth something). As the narration points out, Marie Curie taught for two more years before the Sorbonne would grant her a professor title. Her exclusion from the Nobel nomination as well as from recognition by Sorbonne colleagues both exemplify the obfuscation of women in STEM and other traditionally male fields. Truly a pioneer, Curie was the first woman to teach at the Sorbonne (149).

Montero's narrative connects Curie's self-doubt to women past and present who seek to enter disciplines dominated by men, have insufficient female models, and face social pressure to relinquish their goals: "Cuando todo el entorno y tu propia educación te están diciendo que no eres, que no sirves, que no correspondes a ese #Lugar, es difícil no sentirse una impostora" (149; When the whole environment and your own upbringing are telling you that you do not exist, that you are not useful, that you do not belong in that #Place, it is difficult to not feel like an imposter). *La ridícula idea* highlights that women must possess extraordinary determination to pursue work in STEM and other typically male domains and that Curie challenged social norms for much of her life.[4] Moreover, by examining Curie's exclusion along with her extraordinary professional achievements, Montero points out the double standard that women must outperform men to receive validation.

INSTRUCCIONES PARA SALVAR EL MUNDO

While *La ridícula idea* focuses on memoir and the challenges faced by highly successful female scientific figures like Curie, another of Montero's works,

Instrucciones para salvar el mundo, presents a fictional female scientist who is unable to continue her career in the field due to political oppression for non-normative sexuality.[5] The youngest full professor in Spain, Cerebro is imprisoned for nine months near the end of the Franco dictatorship under the *Ley de Peligrosidad y Rehabilitación Social* (law on dangerousness and social rehabilitation) for an affair with a female doctoral student. Her decision, when she is released in 1975, to never again seek an intimate relationship with a woman attests to the trauma of her social and professional expulsion (251). In the bar that Cerebro frequents nightly to anesthetize herself to those painful memories, she meets the novel's protagonist, Matías, a loner figure who is mourning the loss of his wife and best friend to cancer.

As a female scientist and gay woman during the Franco years, Cerebro embodies a double marginalization. Like Cerebro's outsider status, the places that Cerebro inhabits—the bar that functions as her second home and the inherited family house that serves as her official one—lie on the perimeters of Madrid close to the M-40. As dominant political and social norms have consumed Cerebro and transformed her into a ghost of her former self, urban development, with its office buildings, corporate campuses, stores, and nightclubs, engulfs her large stone "palacete" (187; mansion), now in ruins, in a once-wealthy residential neighborhood. The almost empty house, with its possessions sold to support her and her bar tab, personifies her ousting from academia, and the bar, appropriately named the Oasis, acts as refuge from sleepless nights in a house that mirrors her professional demise. Ironically, a scientific approach informs Cerebro's alcoholic self-obviation and mission to forget the public humiliation and termination of her scientific career: "había cumplido con exactitud y perseverancia de investigadora científica su férreo programa de embrutecimiento" (182; she had achieved with precision and perseverance of a scientific researcher her unwavering plan of desensitization). Her professorial scientific persona endures, however, despite the decades that have passed since she last taught.

LÁGRIMAS EN LA LLUVIA AND *EL PESO DEL CORAZÓN*

Bruna Husky, the protagonist of *Lágrimas en la lluvia* and its sequel, *El peso del corazón*, is a product of science rather than a scientist herself, a former warrior turned detective and one of a new species of beings bioengineered to carry out specific tasks, such as combat, mining, and mathematical calculations.[6] Montero's narration identifies Bruna Husky as female, using the subject pronoun "ella" (she). In the first novel, she saves her

own species from an annihilation and demonization plot, and in the second, she discovers the illegal sale of radiation and secures medical care for a ten-year-old girl from Earth's most contaminated area who suffers from radiation-induced illness. In Montero's trilogy, women throughout the singular polity called *Los Estados Unidos de la Tierra* (The United States of the Earth) have the same legal rights as men; yet, gendered hierarchies continue in this imagined future. Even the genetically engineered, physically strong Husky has internalized some gendered roles, suggesting the inefficacy or disinterest on the part of the male-dominated sciences to address gender issues. In both novels, a stereotypical male figure, the police inspector Paul Lizard, with whom Bruna has a professionally competitive and personally intimate relationship, rescues her from likely death. Bruna critically observes his tendency to have the last word, yet his corpulent dominance sexually excites her (*Lágrimas* 149).[7] Nonetheless, Bruna's social ostracism on Earth stems largely from her android rather than her female identity: "Somos una especie subsidiaria y unos ciudadanos de tercera clase" (*Lágrimas* 61; "We're a secondary species and third-class citizens" [*Tears* 48]). Above Earth, however, gender inequality undergirds the floating territory Labari, a so-called perfect, human-only society: "Las mujeres no eran nadie, no eran nada. Menos que los reps en la Tierra" (*El peso* 188; "Women were nobodies. Their standing was even worse than that of reps on Earth" [*Weight* 156]). Montero's futurist protagonist, a doubly discriminated bioengineered female, points back to the marginalization of women in STEM today.

Unorthodox Research, Theories, and Texts

While scientific inquiry by its nature pushes boundaries of the known, the theories, discoveries, and scientists in these narratives occupy the margins of their fields or propose hypotheses that challenge widely accepted understandings of the natural world. Emphasizing ecological interconnectedness, these texts also stress the need to consider the benefits and the harm that scientific work may cause to all life forms.

LA RÍDICULA IDEA DE NO VOLVER A VERTE

If male scientists negated Marie Curie's contributions when she and Pierre worked in partnership, colleagues insisted that Marie would not accom-

plish any more significant work after Pierre's death, and they diminished her role in the discovery of radium. Yet the narration points out that while Pierre Curie and other peers were working on more newsworthy experiments, Marie Curie was developing a means to measure radium that would constitute a critical service to industry, medical research, and the general public (145–46).

Moreover, Curie insisted on the scientific rigor of her work. When British physicist and mathematician Lord Kelvin published a letter to *The Times* asserting that radium was not an element but rather a compound of helium, Marie worked with another scientist for three years to successfully extract pure radium metal from uraninite (also called Pechblende), which until then was known only in its salt form. In recounting Kelvin's challenge to Marie's reputation, Montero repeats a remark by one of Curie's female biographers that had Marie been a man, Kelvin would not have questioned her discovery.[8] Furthermore, he would have written to a scientific journal rather than a widely read general newspaper: "Qué manera de desdeñar a Marie; y de intentar rebajarla públicamente" (146; What a way to spurn Marie; and to try to publicly humiliate her). The dichotomies of male/female, noble/commoner, journal/newspaper in Kelvin's attempt to discredit Marie underscore the inferiority generally associated with women researchers.

In contrast to the male scientists' patriarchal dismissal of Marie's work, Montero's narration proposes that her perspective as a woman leads to unique contributions that men might not make. The text equates her isolation of radium to giving birth, thus suggesting the transferability to research of patience during gestation and dedication after parturition. Marie Curie put her work before her person, even before she began to research radium. As a student at the Sorbonne, she lived on little food, often without enough money to heat her apartment. If, as the text suggests, Marie viewed her research as a type of motherhood, abnegation was part of both roles.

Motherly sacrifice to her work, a surrogate child, obscured Curie's recognition of physiological harm from contact with radium. She and her daughter Irène only implemented safety measures in their lab in 1926, well after such precautions had become standard, and then they ignored them despite evidence of radium's danger: "incluso hacían cosas tan bárbaras como pasar radio y polonio de un recipiente a otro aspirando las sustancias con la boca por medio de una pipeta" (121; they even did things as frightful as passing radium and polonium from one recipient to another

by breathing in the substances with their mouth through a pipette). A 1954 photo of Irène sucking on such a pipe and Montero's narration highlight the Curies' bodily sacrifice for scientific discovery: "Ese cuerpo traidor; pero, también ese pobre cuerpo maltratado y cometido a una radiactividad brutal durante tantos años. Al final, ¿quién termina siendo el rehén de quién?" (190; That betraying body; but, also that poor abused body dedicated to brutal radioactivity during so many years. In the end, who ends up being the hostage of whom?). Indeed, Marie, Irène, and Irène's husband, with whom Irène won a Nobel for discovering artificial radioactivity, all died of radium-induced illnesses (125–26).

Although the Curies were not alone in their fascination with radium, whose magic was widely touted, the narrative suggests that their willful blindness renders them at least partially responsible for the public's casual contact with this noxious element. The text refers not only to the health problems of Marie's lab employees, but also to the death of nine North American female factory workers (122–28). The "radium girls" pointed paintbrushes with their lips to draw the numbers and hands on watch faces and, for fun, painted their nails and teeth (Orci). Moreover, as the narrative explains, radium was added to a variety of cosmetics such as creams that purportedly delivered youthful skin or combatted cellulitis, endangering women's health in the name of beauty: "En esto de la belleza las mujeres siempre hemos hecho barbaridades" (103; When it comes to beauty, we women have always done foolhardy things). Ironically, Marie Curie prioritized intellect, yet her discovery fed an industry focused on women's physical appearance.

Congruent with Marie Curie's atypical achievements as a woman scientist of the first half of the twentieth century, *La ridícula idea* presents an unorthodox narrative form that blends biography, memoir, essay, scientific writing, and social media. Rather than fit a pre-determined convention, the text is in process, a few lines on the author's tablet: "Pero éste no es un libro sobre la muerte. En realidad, no sé bien qué es, o qué será" (10; But this is not a book about death. In reality, I do not know for sure what it is, or what it will be). In addition to blurring genres, Montero combines the disciplines of technology, biology, and writing through metaphors that employ the language of science. The sentences on her tablet are "células electrónicas aún indeterminadas" (still undetermined electronic cells) and books "crecen como zigotos, orgánicamente, célula a célula . . . cada vez más complejas, hasta llegar a convertirse en una criatura completa y a menudo inesperada" (10; grow like zygotes, organically, cell by cell . . . each time more complex,

until becoming a complete and often unexpected creature). The narrating voice also merges philosophy and biology in the observation that loved ones' births or deaths bring us face to face with our existence, "bordeando esas fronteras biológicas" (9; bordering those biological frontiers). As a narrative that does not conform to a traditional genre, that cannot be easily defined, and that refuses to stay in an assigned place, *La ridícula idea* the text acts as a metaphor for women pioneers in the STEM fields.

The inclusion of hashtags throughout the text contributes to its unorthodoxy, voices a feminist perspective, and communicates solidarity in protest. At the same time, an index of these hashtags at the end of the book places the unconventional within convention and thus challenges the boundaries of textual practices and gender/genre. The hashtags call attention to major themes—restrictive expectations for women, the judged strangeness of nonconforming women, a metaphysical theory of coincidences, intimacy, and the therapeutic and political power of words and writing: #HacerLoQueSeDebe (#DoWhatOneShould), #CulpaDeLaMujer (#WomensGuilt), #LugarDeLaMujer (#WomensPlace), #HonrarAlPadre (#HonorTheFather), #HonrarALaMadre (#HonorTheMother), #HonrarALosPadres (#HonorParents), #Ambición (#Ambition), #Raro (#Strange), #Coincidencias (#Coincidences), #Intimidad (#Intimacy), #Palabra (#Word), and a few other similar hashtags (211).

These single words and brief phrases invite others to identify with the narrated story and post with the same hashtags to form common interest groups. Embedding the contemporary phenomenon of hashtags in the text suggests the pertinence of Marie Curie's gender-based exclusions, restrictions, and expectations for women of the twenty-first century. Common use of this social-media tool to garner support for protests and social change indicates that Montero's text seeks the same.[9] For example, naming Curie with the hashtag #Mutante recognizes marginalization as socially constructed and, in the context of this narration, presents her counter-conventional persona positively. The multi-genre text of *La rídicula idea*, with its hashtags, reflects the boundaries that women cross, complicate, challenge, and confound when participating in the sciences.

LÁGRIMAS EN LA LLUVIA AND *EL PESO DEL CORAZÓN*

For female scientists in these narratives, science and research form part of an identity that others view with suspicion. Curie had to battle the disregard of male peers, and Bruna Husky faces marginalization as a tech-

nohuman. Husky's critical views about the environment's compromised state also set her apart from a dominant discourse regarding technological progress. In the futuristic world of the year 2109, air contamination has worsened and is graver in the poorer southern hemisphere, the glaciers have melted, and the polar bear has become extinct.[10] While there are many specific examples of this contaminated world in *Lágrimas en la lluvia* and *El peso del corazón*, the polar bear's extinction exemplifies Bruna's perceptiveness of human activity's negative impact on Earth's ecological balance. Although in the novel the last polar bear had already died fifty years earlier, Madrid's president constructed a World Expo-like pavilion to house a bio-engineered replica, Melba, that replaces Madrid's symbol of the bear and the mulberry tree which today stands in the Plaza del Sol. The replica bear's placement in an imitation arctic environment highlights humans' manipulation of the natural world to suit their own ends. The narration describes in detail the final polar bear's excruciating death, noting also that a world war distracted the public from saving her. Visitors watch Melba's final moments on film as a moving belt transports them along the tank that houses her:

> Realmente parecía que uno estaba allí, viendo cómo se partía el último pedacito de hielo al que la osa pretendía aferrarse; cómo el animal nadaba cada vez más despacio, cómo resoplaba al hundirse bajo la superficie, cómo sacaba con un esfuerzo agónico su oscuro morro del agua y lanzaba un gemido escalofriante, un gruñido entre furioso y aterrado. Y cómo desaparecía al fin debajo de un mar gelatinoso y negro. (*Lágrimas* 187)

> You really felt as if you were there, watching the last small piece of ice that the bear was trying to hang on to breaking up; the animal swimming more and more slowly, snorting as it sank beneath the surface, then thrusting its dark snout out of the water with one last, agonizing effort and letting out a chilling wail, a furiously terrified growl. And then finally disappearing under a black, gelatinous sea. (*Tears* 159–60)

This passage evokes in the reader deep sadness and urgency to help this species now, before it is too late. The switch from the female "la osa" (the bear) to a generalized "el animal" (the animal) prompts the reader to transfer climate change's impact on one species to all beings. Bruna, who con-

stantly recites the years, months, and days left in her ten-year lifespan, identifies with the fabricated animal, who also will die at an early age of a cancer that affects all replicas. Her knowledge that this genetically exact reproduction will be followed by "[u]na infinita cadena de Melbas en el tiempo" (*Lágrimas* 189; "an infinite chain of Melbas down through the ages" [*Tears* 162]) may suggest to Bruna not only her own mortality, but also that she is replaceable.

Bruna's empathy with this animal, whom she spots every time she visits, even when others cannot find the bioengineered bear, aligns with her sensitivity to the environment's deterioration and is coherent with her denouncement of the global energy company Texaco-Repsol's "parques-pulmón" (*El peso* 36; "lung parks" [*Weight* 23]) within Madrid's Retiro Park, consisting of artificial trees that create a supposed "espacio ecológico y puro" (*El peso* 36; "ecological, pure space" [*Weight* 23]): "después de haber esquilmado el planeta, ahora aparentaban ser los sumos sacerdotes de la ecología" (*El peso* 37; "after having overexploited the planet, the company now pretended to be the high priest of ecology" [*Weight* 23]). As a genetically engineered being, the Bruna Husky character's counterhegemonic critique of unsustainable resource exploitation and her message that bioengineering cannot substitute the natural environment is especially patent.[11]

INSTRUCCIONES PARA SALVAR EL MUNDO

In *Instrucciones*, the female scientist character emphasizes ecological interconnectedness in her references to several scientists' work: biologist Paul Kammerer; evolutionary biologist and science historian Stephen Jay Gould; cell biologist and biochemist Rupert Sheldrake; fictional physicist and mathematician Aaron Fieldman; and the scientist, inventor, and environmentalist John Lovelock. Cerebro identifies with marginal scientists who, like her, "triunfiaron y luego cayeron en el abismo . . . o aquellos que habían sido criticados y maltratados por sus pares" (251; triumphed and then fell in the abyss . . . or those who had been criticized and mistreated by their peers). The male gender of all of the researchers with whom Cerebro identifies suggests an implicit message that women in STEM historically have few female models. Despite this gender difference, Cerebro regains her identification as a scientist, and her self-esteem grows as she discusses the other scientists' theories with Matías.[12]

The concepts that Cerebro introduces suggest that life has positive purpose, justice occurs, and explanations for the inexplicable exist. Kammerer's Law of Seriality, published in 1919, counters the widely accepted Second Law of Thermodynamics, which states that energy in the physical world causes entropy, or disorder and uncertainty (Atkins 49–78). Based on his observation that coincidences occur in serials, Paul Kammerer asserted that the universe also tends toward order. For the character Matías, the notion that "las coincidencias tenían que tener un porqué" (coincidences had to have a reason) assuages the existential angst from his wife's death: "tal vez el mundo pudiera recuperar algún sentido" (69; perhaps the world could recuperate some meaning). Kammerer challenged an accepted law not only of physics but also of biology. This scientist became well known for an experiment that disputed the Darwinist position that genetic adaption occurs over many generations, instead supporting Lamarck's theory that organisms can pass on environmental adaptations to offspring. Kammerer was accused of falsifying the results yet claimed innocence in his suicide note.

Cerebro takes the side of the ostracized scientist Kammerer, remarking that Stephen Jay Gould had affirmed that the experiment probably did show this generational change. However, this Harvard professor was also controversial. As Richard York and Brett Clark explain, Gould was part of the organization Science for the People, which protested the Vietnam War, and he critiqued the prevailing notion of neutrality in scientific research, sought connections between science and the humanities, challenged biological determinism, and was critical of the atomic bomb (15–17).[13] Gould's positions align with Cerebro's questioning of scientific pursuits that compromise life, a view also found in *El peso del corazón*'s indictment of nuclear waste. In summary, Gould's life's work emphasized social equity and the need for the humanities and sciences to inform each other, themes that traverse the Montero narratives analyzed in this essay.

It may be coincidental that the film *A Glorious Accident: Understanding Our Place in the Cosmic Puzzle* (Wim Kayzer, dir.) places two of the scientists to whom Cerebro refers in *Instrucciones* in conversation about their understanding of man's existence in the universe: Gould and Sheldrake. The characterization of the six men in the film as "creative thinkers" who "push the boundaries of scientific theories and philosophical ideas" (Kayzer, DVD back cover) is congruent with Montero's focus on renegade scientists whose work addresses broader human experiences. Through the creation

of her character Cerebro, however, Montero narratively injects a female, lesbian voice into the male-dominant conversation portrayed in the film that is representative of gender inequality in STEM. Cerebro's view is consistent with Sheldrake's questioning of hegemonic precepts, such as human-centered theories of one-directional progress in evolutionary biology that justify humankind's exploitation of nature (Kayzer 19:57–21:35). Sheldrake holistically notes that "everything is nested within something else" (9:50–9:52). Earth sits within the solar system, the solar system within a galaxy, this galaxy within the universe, and so on. In the opposite direction, ecosystems house organisms, composed of organs, made of tissues, consisting of cells, then atoms, and finally subatomic particles (9:52–11:10). Connection also undergirds his morphogenetic fields theory, which proposes that groups within a species transmit the memory of a certain practice to others in the species even when they have had no physical contact.[14] In short, Sheldrake's theories consider how matter and beings cooperatively develop.

Also focused on interconnection, Cerebro's conversations with Matías about Aaron Fieldman, a disenchanted physicist who worked on the atomic bomb with the Manhattan Project, emphasize that human actions have consequences for all other beings and the physical world. Unlike the other scientists whom Cerebro references, Fieldman seems to be a fictional character; nonetheless, as Serra-Renobales points out, his theories provide Matías and the reader a moral compass that prioritizes one's impact on others (*Instrucciones* 76).[15] Cerebro positions Fieldman as a singular critical voice, explaining that he died in a fight with soldiers at Los Alamos, or perhaps was killed, because he was going to inform the public about the atomic bomb. Cerebro's attribution of the bomb's use to scientific ambition rather than national security affiliates her with this fellow scientist who critiqued research quests with destructive ends: "Yo creo que simplemente querían ensayar sus bonitas bombas, a ver cuál de las dos funcionaba mejor" (225; I think that they simply wanted to try out their lovely bombs, to see which of the two worked better).[16] Additionally, Cerebro highlights a theory by Fieldman that human actions reverberate energetically to physically impact the world, which she likens to the physical principle of communicating vessels, or Pascal's law on fluid mechanics and pressure equilibrium ("Pascal's"). Every single action has consequences, either contributing to or detracting from systemic harmony; in other words, positive actions beget more positive actions and vice versa.

Lastly, Cerebro also introduces the work of John Lovelock, one of the earlier scientists to discuss climate change and who is also credited with leading the creation of the field of Earth Sciences.[17] Like the aforementioned scientists, Lovelock proposes hypotheses that challenge prevailing assumptions in science and society: "the whole key to my work, throughout my career, was that whenever they started saying something was the standard wisdom, I started saying 'it can't be'" (Gribbin and Gribbin 72). His controversial Gaia hypothesis asserts that Earth is a "single complex system" that self-regulates to support life, which scientists scorned when first published in the *New Scientist* in 1975, in part because of its popularity among hippies and the green revolution that Rachel Carson's fictional *Silent Spring* spurred (Highfield; Gribbin and Gribbin xx, 118, 144–50, 161).[18] Today, the Gaia principle has its supporters and detractors (Highfield). Lovelock's ecocentric stance that Earth will adjust, if not necessarily for human survival, and his pragmatic support of technologies that he believes will allow humans to survive longer, such as genetically modified foods and fracking, place him at odds with the majority of environmentalists (Gray). Cerebro refers to Lovelock when she positions her concern for climate change as counter normative as well: "'Ni una sola nube en la península, cielos completamente despejados y cuarenta grados de temperatura, de manera que ¡sigue el buen tiempo!' . . . Pues se van a enterar. Con el cambio climático, España será por fin un desierto perfecto" (*Instrucciones* 106; Not a single cloud on the peninsula, skies completely clear and forty degrees, so the good weather continues!' . . . Well they are going to realize. With climate change, Spain will be at last a perfect desert). Moreover, Cerebro connects Lovelock to Kammerer when she explains Lovelock's work on an instrument to determine if life exists on Mars based on the detection of entropy or order.[19] The scientific work of Lovelock, Kammerer, Fieldman, Gould, and Sheldrake help us understand what it means to be human in the context of an interconnected ecology. Cerebro characterizes these scientists' ideas as "hermosa[s]," "consoladora[s]," and "conmovedora[s]," "poesía" more than "ciencia" (68; beautiful, consoling, and moving, poetry more than science). The reassuring nature of their theories notwithstanding, Montero's narratives make clear that this continuity among male scientists often is not afforded to women, who many times work in isolation.

In all four works, unorthodox research, theories, scientists, and texts express that we must be sensitive to how scientific innovations may positively and negatively impact biodiversity and quality of life. The nar-

rating voice of *La rídicula idea* explains that polonium, the first element Curie discovered, "últimamente se ha puesto de moda como una eficiente manera de asesinar" (11; recently it has become fashionable as an efficient method to murder). Radium, the second element she isolated, is toxic, yet its medical applications save lives, too.[20] In *Lágrimas* and *El peso*, engineered beings help multiple species survive; however, human inventions have also deteriorated Earth's capacity to sustain life. Cerebro, of *Instrucciones*, schools Matías on nefarious uses of science along with theories that highlight connection, order, and equilibrium in what seems like a chaotic, nonsensical world.

Creating Community for and by Women in STEM

Beginning in the 1960s and gaining momentum in the 1970s, feminist literary critics recognized the value of studying women's writing separately from men's in order to understand social, political, and market influences, and to highlight a tradition of female-authored literature (Moi 61–63). Elaine Showalter's *A Literature of Their Own* (1977) mapped continuity in the development of British literature by women from the mid-nineteenth to the late-twentieth centuries, and Sandra M. Gilbert and Susan Gubar's *The Madwoman in the Attic* (1979) studied the female artist and her literary strategies within male-dominant society (Moi 68–72). These and many other works provided theoretical approaches to affirm the literary and political significance of women's writing while also creating literary histories. In the sciences, as well, feminists have understood that to achieve gender equality, the often forgotten or marginalized contributions of women must be acknowledged (Osca Lluch 7). The Montero novels in this study suggest that establishing community for scientific women is critical to supporting them in their professional and personal lives and encouraging more women to enter STEM fields.

LA RIDÍCULA IDEA DE NO VOLVER A VERTE

Montero's *La ridícula idea* asserts the important role of foremothers in countering women's experiences of exclusion in STEM. Narrated congruence between Curie's difficulties and those of other women scientists constructs female solidarity out of isolation. The text briefly tells

the stories of four women—Lise Meitner (1878–1968), Rosalind Franklin (1920–1958), Henrietta Swan Leavitt (1868–1921), and Jocelyn Bell Burnell (1943–)—who made significant contributions in, respectively, nuclear fission, DNA, a standard for measuring stellar brightness ("Henrietta Swan Leavitt"), and radio pulsars, or signals from stars ("Jocelyn Bell"). By including their stories, Montero's narrative vindicates women whom male mentors or colleagues attempted to render invisible. In the cases of Meitner, Franklin, and Bell, only their male colleagues received Nobel prizes. German chemist Otto Hahn refused to credit Meitner when he won in 1944 because of her gender and Jewish identity. Franklin, who died young of ovarian cancer, probably from exposure to X-rays, may not have known that two male colleagues based their work on her photo of DNA (*La ridícula idea* 12–13). While these biographies alone attest to patriarchal dominance in STEM, placed together they show systemic discrediting of women who have made significant contributions to the sciences.

By inserting four women scientists from different periods in a narrative about Marie Curie, in a span of four pages, *La rídicula idea* emphasizes a shared experience of erasure and forges a community of women in STEM across time and place. Montero further highlights the importance of community with a story about her own fan network and social-media connections. A female Facebook friend in Canada, unaware that Montero was writing about Curie, sent her a note about women's lack of acknowledgment in the sciences and named the four female scientists Montero mentions in her text, two of whom the author was not aware before the fan's message. In this way, *La ridícula idea* emphasizes a shared feminist project of recognizing female scientists' contributions as an end in itself and employs the history of key women in order to inspire contemporary girls' and women's pursuit of studies and work in these fields.

Montero also forges a feminist solidarity with one of Curie's biographers, Barbara Goldsmith, who authored *Obsessive Genius: The Inner World of Marie Curie*.[21] Goldsmith delves into Curie's scientific studies more than Montero does, yet both emphasize that Curie's female identity shaped how she experienced the hardships of poverty in Russian-occupied Poland, the death of a loved one, and the lack of support for her work. Intimating their shared perspective, Montero repeats the juxtaposition with which Goldsmith initiates her text. In the 1995 ceremony in which François Mitterrand bestowed on the Curies the national honor of burial at the Panthéon, the French president affirmed that Marie possessed "the exemplary struggle

of a woman who decided to impose her abilities in a society where abilities, intellectual exploration, and public responsibility were reserved for men" (*La ridícula idea* 15), yet the words etched into the Panthéon's façade attest to women's exclusion from the public sphere: "To Great Men from a Grateful Country" (15). Montero, however, goes a step further than Goldsmith when she notes Mitterand's use of the past tense (as quoted by Goldsmith) in reference to gender inequities: "Estaban, dijo. Como si esas desigualdades ya hubieran sido superadas por completo en el mundo contemporáneo" (20; They were, he said. As if those inequalities already had been completely overcome in the contemporary world). By referencing Goldsmith's biography in her narrative, Montero makes patent a community of female writers who seek to honor women in STEM and understand their lives as scientists, women, and individuals.[22]

To further her presentation of women's shared experiences, the narrative emphasizes a quotidian rather than idealized super-woman portrait of Marie Curie. While the achievements of this impressive scientist might be difficult to emulate, her struggles in managing a family while studying and working make her more relatable. Marie speaks proudly in her diary about her intellectual parity and emotional partnership with Pierre, yet she also comments that housework and childcare were her responsibilities alone.[23] Although Marie does not critique her husband, Montero's remark highlights the inequity of the double work-shift for women: "Durante estos años, Pierre publicó bastantes más artículos científicos que Marie. No puedo decir que me extrañe" (97; During these years, Pierre published considerably more articles than Marie. I cannot say that I am surprised). The narration connects Curie's challenges as mother, wife, and researcher to Montero's working female friends (not necessarily scientists) who felt overwhelmed after having a baby, albeit with domestic help (95). Linking the humanities and the sciences, Montero broadens the circle of women whose careers suffer under patriarchy with a reference to Carmen Laforet's 1945 *Nada*. The narrator hypothesizes that had it not been for her tenacity, Curie's life would have resembled those of the novel's tormented old women with unrealized dreams, as well as that of Laforet, who was unable to maintain her creative force "en medio del machismo ramplón de la posguerra española" (52; in the midst of the crude machismo of the post-Spanish Civil War). By writing about parallel experiences from different time periods and professional fields, Montero amplifies the recognition that social expectations, which mandate women care for the family, often

hinder women's professional success yet benefit men.

Montero returns often to the theme of "#Intimidad" (69; #Intimacy) in her portrayal of Curie, showcasing the commonness of her personal life in order to augment her potential as a model for many women. Typical of long-time couples, Marie understood banal details about Pierre's preferences (70). Montero herself relates to the "#Intimidad perdida" (lost #Intimacy) that she and Curie suffer as widows (69). Curie's devastation when her first love ended the relationship, desperation after Pierre's death, and desire for intimacy, friendship, and professional partnership with the man she loved after Pierre's passing (physicist Paul Langevin), as well as her torment when Langevin is with his wife, highlight her humanity. In light of these challenges, *La rídicula idea* narrates a Marie Curie who is part of a female "us," in possession of a strength that eclipses men. Referencing Langevin's fear of his wife's revenge for his affair, Curie remarks to a friend: "Tú y yo somos duras . . . él es débil" (156; You and I are tough . . . he is weak). The narrator broadens this observation: "Y aquí hay que hacer un punto y aparte para hablar de la #DebilidadDeLosHombres, una gran verdad que todas conocemos pero ninguna menciona. Quiero decir que el verdadero sexo débil es el masculino" (156; And here we must make a full stop to speak about the #WeaknessOfMen, a great truth that we all know but no one mentions. I mean that the true weak sex is the masculine one). In this instance, and in others, one notes echoes of second wave, difference feminism, which acknowledges gender distinctions even if socially constructed.[24] Montero's narrative forcefully creates a community of successful women who have faced gender-based obstacles in their work and intimate lives. In this way, rather than an unattainable ideal, the text proposes a Marie Curie with whom other women can identify for their own ambitious aspirations.

Although Montero's text provides a feminist perspective of Marie Curie's life, the narrating voice notes with disappointment that Marie never wrote of the difficulties she confronted because she was a woman, and the work notes that Curie did not view herself as a champion of women in the sciences (130). Whereas Marie reserved one notebook to record her work and kept another for personal reflections, thus signaling their separation (Goldsmith 141–42), Montero's narrative blends the two to suggest that Marie Curie can best be understood as a woman scientist, rather than as one or the other. That is, *La rídicula idea* narrates Curie's achievements in the context of enduring gender-differentiated expectations in order to

present a feminist reading of this remarkable female scientist who challenged the boundaries of science and gender even as those boundaries circumscribed her.

INSTRUCCIONES PARA SALVAR EL MUNDO

Cerebro narratively creates a community of scientists from various disciplines as she shares their theories with Matías during conversations in the Oasis bar. Granted, these individuals are all male, yet through discussing their work, Cerebro places herself within a scientific network from which she had been excluded decades prior. In addition, she forges a bond with an individual who seems drastically different from her, a working-class taxi driver, which enables both to find meaning in living. At first, each character is guarded. Due to fear of humiliation from slurring her words in her inebriety, Cerebro refrains from telling Matías of a science-based idea that would have lifted his spirits: because atoms recycle, existing eternally, it is possible that his and his wife's atoms will unite one day in another body (183–84). Cerebro's silence on this occasion suggests the silencing of her scientific voice, of her as a minority figure, and of a theory out of the mainstream. By the narration's end, however, the attention that Matías gives Cerebro when she shares scientific concepts transforms this "vieja insomne y solitaria aferrada a una copa" (insomniac and solitary old woman taking refuge in drink) into "la profesora que había sido" (182; the professor that she had been). The use of the past tense seems to indicate the late recognition of her contributions, like that of other female scientists, as well as the enduring professional repercussions of expulsion from academia for Cerebro. Nevertheless, through validating Cerebro as a scientific thinker, Matías and this former professor develop a friendship and together create community for each other.[25]

In addition to the bond between characters within this novel, Montero discursively constructs intertextual connections. Cerebro thinks of Marie Curie when she contemplates that atoms of past lives form part of present ones: "se puede decir que todos los seres humanos que ha habido en la Tierra viven en mí, y que yo viviré en todos los que vendrán en el futuro" (184; you might say that all of the human beings that have been on Earth live in me, and that I will live in all of those that will come in the future).[26] This reference in *Instrucciones* to Curie, the subject of *La rídicula idea*, published five years later, illustrates the texts' insistence on the

need for female scientists to inspire women of future generations. Textual intermingling continues when Montero the narrator discusses in *La rídicula idea* Sheldrake's ideas on coincidences, a notion that Cerebro had explicated in *Instrucciones*: "creo que los científicos como Rupert Sheldrake son muy dudosos, pero, con los años, tengo la creciente sensación de que hay una continuidad en la mente humana; de que, en efecto, existe un inconsciente colectivo que nos entreteje . . . Y las #Coincidencias forman parte de esa danza, de ese todo" (*La rídicula idea* 142; I think that scientists like Rupert Sheldrake are very dubious; however, as I get older, I have the growing feeling that there is continuity in the human mind, effectively, that an unconscious collective exists that intertwines us . . . And that #Coincidences form part of that dance, of that whole). Noting the uncanny similarities between Curie's reflections on Pierre in her year-long diary and her own thoughts on Pablo Lizcano's death during the previous year, Montero, in *La rídicula idea*, like her character Matías in *Instrucciones*, finds comfort in scientific theories that emphasize positive, deep associations among living beings (142). Montero creates an intertextual dialogue between these two narratives that mimics the connectivity proposed, in different ways, by Sheldrake, Gould, Kammerer, and Lovelock. The four novels examined here consistently draw on scientists and theories that suggest our actions, positive or negative, conjoin us with and have repercussions for other beings.

LÁGRIMAS EN LA LLUVIA AND *EL PESO DEL CORAZÓN*

Montero's Husky narrations extend the theories of interwoven lives seen in *Instrucciones* to encompass an intersectional approach to community and a care-based ethic.[27] In *El peso del corazón*, a female nuclear scientist named Mai Burún cares for children in a war zone and seeks to protect Earth's environment from further contamination in her work on an underground nuclear-waste storage facility. The password that Bruna must give to Mai to gain information about the site, "Tranquilidad" (*El peso* 328; "Tranquility" [*Weight* 275]), signals the peace that Mai offers orphaned children in her home and also alludes to her opposition to the greed that, she asserts, presents the greatest threat to peace and environmental sustainability (*El Peso* 332). Although Mai revealed the nuclear-waste cemetery's location in exchange for money, an action that enabled Labari to fuel its misogynist, racist society, she did not know of this end and took the money to pro-

vide for the rescued children (335). In addition to her actions, her physical appearance signals an affinity with nature; her unaltered body and grey hair are unusual in a future in which most people recur to plastic surgery and hair color. Mai's and Bruna's care for others opposes dominant prejudices, political maneuverings, and capitalist-driven motives.

The android Husky performs a regenerative role congruent with Donna Haraway's cyborg model of "oppositional consciousness" in a "post-gender world," in which affinities with others do not depend on race, class, or gender.[28] Husky proclaims concern with only her needs, yet she attends to others throughout both novels, in the process facilitating unconventional alliances. Bruna Husky herself defies traditional identity boundaries as a female with a gender-fluid sexuality like that of most technohumans and humans in this fictional future (122). Although Husky cannot biologically reproduce, she contributes to a caring network that broadens the notion of mothering to community with diverse species.[29] She provides shelter and food to two extraterrestrial beings, the Balabi Bartolo and the Omaá Maio, and convinces a friend to accept Maio, who is a flutist, into her orchestra. The positive impact of Bruna's kind action amplifies when Maio and Mirari become intimate partners. The protagonist also intends upon her death to give her engineered arm to Mirari, a violinist with a dysfunctional prosthetic one.[30] Further, Bruna takes an orphaned ten-year-old girl named Gabi from Earth's most polluted area, cares for her, gets her medical treatment, and finds her a permanent home with her friend Yiannis. Her detective work calms exacerbated prejudices against technohumans in the first narrative. In the sequel, she prevents the spread of global war and nuclear-waste contamination, and she terminates Labari's energy source, at least momentarily.[31] In summary, Husky, a bioproduct of scientific innovation, and Mai, a woman scientist, serve as restorative, nurturing forces.[32]

Toward the end of *El peso del corazón*, Bruna finishes a story that she has been telling Gabi throughout the novel. In her narration about the mythical three-headed Cerberus who guards Hades, the monster transforms into a gentle companion who represents friendship and interspecies collaboration. Bruna delivers the tale in segments, a form consistent with women's oral storytelling and serial publications. She explains to Gabi that she includes this frightful dog, "Porque los monstruos somos hermosos" (*El peso* 368; "Because we monsters are beautiful" [*Weight* 309]). Relating herself with the monstrous in an oral, serial narrative, Bruna voices solidarity with women and feared others, as well as acceptance of her own

engineered being. Nonetheless, *Lágrimas en la lluvia* and *El peso del corazón* make clear that one technohuman hero, several caring humans, and a pair of extraterrestrial beings cannot alone address Earth's environmental contamination, political strife, and social inequities. Furthermore, technical innovations may prolong resources and help sustain life, but we must recognize the codependence of all species and sustain each other in a world with fewer and contaminated resources for life on planet Earth to continue.

In the novels examined here, individually and read together, Montero narrates women, women scientists, and a woman made by science who face marginalization in their professional fields and in general society. All of these women persist in spite of their exclusion. In *Staying with the Trouble: Making Kin in the Chthulucene*, Haraway argues that unexpected kinships must be forged that address environmental damage and contemporary economic and social inequalities. The characters in Montero's narratives exhibit a drive to succeed in their respective disciplines, to assist those in need, to seek alliances, and to deeply connect with others, despite challenging circumstances. Recognizing the solitude and ostracism women in the sciences often experience, Montero's texts discursively create support networks of, for, and by women in STEM. If the Bruna Husky science-fiction narratives address more directly Haraway's assertion that "science fact and speculative fabulation need each other, and both need speculative feminism" (3), all four of these works propose that women's scientific research—past, present, and future—is crucial if we are to address the pressing issues of our times. These texts also suggest that literature and, more broadly, the humanities bring critical perspective to the impact of scientific developments in order to realize a more just and sustainable world for women, marginalized persons, and for all that inhabit Earth now and in the future.

NOTES

1. Montero published the third novel in the Bruna Husky series, *Los tiempos del odio* (2018; Times of hatred), after I had completed this study. The introduction of a new character, Ángela, continues the themes of women in STEM and female solidarity discussed here. A mathematics and computing genius, she helps Husky understand a terrorist case and funds space travel so Husky can search for her kidnapped lover.
2. I have used English editions for the translations of *Lágrimas en la lluvia* and *El peso del corazón*. All other translations are mine.

3. As Goldsmith notes, in the Poland of the late nineteenth and early twentieth centuries, women were viewed as physically and mentally unfit for work. Peasant women worked in factories due to necessity, but for less than men's wages. And, while women worked in jobs formerly held by men during a Polish uprising against the Russians, the women returned to housework and childcare when the men took their jobs back after the rebellion failed (23).
4. Bill Bryson observes that Curie was not elected to the Academy of Sciences because the men who made such decisions disapproved of the widow's affair with married physicist Paul Langevin (111).
5. Pilar Valero-Costa and Ellen Mayock have centered their respective analyses of *Instrucciones* on the impact of globalization on Spanish society and on Spanish responses to immigration. Luis I. Prádanos considers the novel's network narrative structure and representation of capitalism's negative impact on the environment and on community ("La degradación ecológica"). Prádanos also cites the novel as an example of Spanish literature congruent with degrowth and slow growth ("Towards a Euro-Mediterranean").
6. Critics have found many themes to explore in Montero's Bruna Husky series. For example, both Maryanne Leone and Carmen Flys Junquera examine the first two works from an ecofeminist perspective while Pilar Martínez-Quiroga studies the transfeminism embodied in the protagonist and transmitted through the science-fiction genre. Prádanos identifies a critique of global capitalism ("Decrecimiento"). Juan C. Martín Galvan addresses the posthuman in *Lágrimas*, while Dale J. Pratt attends to the relationship of memory to personhood and identity. Todd Mack discusses a Vermeer painting in Husky's apartment in light of Levinas's understanding of alterity, and Irene Sanz focuses on the perceived other through the interactions between humans and animals in *Lágrimas* and *El peso*. Given the interest that the series has attracted thus far, it will not be surprising if more studies emerge.
7. Fátima Serra-Renobales argues that Lizard exemplifies a more recent tendency in Montero's narratives of positive cooperation between women and men (78).
8. In the last section of this essay, I discuss how Montero narratively joins biographer Barbara Goldsmith in defense of female scientists.
9. This connection with protesting male-centric norms became even more patent when the hashtags #NotOkay and #NastyWoman went viral during the 2016 United States presidential campaign in response to then-candidate Donald Trump's misogynist comments about women and his opponent Hillary Clinton. The #MeToo hashtag to call out sexual harassment and change the culture of tacit acceptance followed one year later.
10. For more on the unequal distribution of wealth and resources between the northern and southern hemispheres in *Lágrimas en la lluvia* and *El peso del corazón*, and on Bruna's relationship with the polar bear, see Leone.
11. Katarzyna Beilin and Sainath Suryanarayanan locate *Lágrimas en la lluvia* within a broader discussion of Spain's enthusiasm for genetically modified foods and a bioeconomy. They argue that the novel supports bioengineered responses to climate change, while also critiquing a lack of ethical consideration for the bioproducts of humans' scientific endeavors (253).

12. One has to wonder if Montero might have found female models for Cerebro whose scientific work would also support the narrated ethical stances on caring for others. Serra-Renobales argues that *Instrucciones para salvar el mundo* is representative of twenty-first century inclusive feminism, of masculine protagonists in solidarity with women, and of the general public's growing interest in science, especially chaos theory and Darwinism.
13. Bill Bryson explains that Gould's 1989 *Wonderful Life* was a commercial success, but scientists disagreed with some of Gould's conclusions and suggested that his eloquent writing often superseded scientific rigor. For example, Richard Dawkins and others were at odds with his assertion that the Cambrian period's evolutionary process was unique, and scientists had not believed for fifty years prior to Gould's supposed revelation that evolution climatically progresses toward man (330–31). In the acknowledgments section of *Instrucciones*, Montero notes her indebtedness to Bryson's *A Short History of Nearly Everything* for the idea that the atoms of Marie Curie and Cervantes reside in us today.
14. In the film, Gould doubts the validity of Sheldrake's morphogenetic theory. Kayzer explains that, for some, Sheldrake is "the new Darwin and Einstein combined" (16:46–16:51) while, for others, he is "someone who . . . has developed a brilliant theory which is hopelessly wrong" (17:06).
15. Searches for information on Aaron Fieldman in books on the Manhattan Project, academic databases, and Google did not turn up an actual person similar to the novel's character.
16. Only a handful of the 150,000 people who worked on the Manhattan Project knew of the overall goal of building an atomic bomb (Kelly 93). Scientists on the interim committee and advisory group to War Secretary Henry Stimson thought that American military lives would be saved if the bomb were dropped, though they acknowledged the scientific community's varying views (Kelly 290–91). A letter from 155 Manhattan Project scientists urged Stimson and President Truman to consider the moral consequences and communicate the conditions of surrender to Japan to avoid the bomb's use (Kelly 291–93).
17. Lovelock's extensive work includes crayons that write on wet glass, methods to protect soldiers from burns, inventions to search for life on Mars, the creation of a device to detect pollutants, observations that led to the discovery of the ozone layer, and more. He received the Wollaston Medal from the Geological Society in 2006, was named Commander of the Order of the British Empire, is a Fellow of the Royal Society (since 1974), and has received many awards in chromatography. Continued interest in his work prompted a speaking tour in the United States in 2006, at 86 years old (Gribbin and Gribbin xix, xxi, 73–76).
18. Lovelock's invention in the 1950s of an electron capture detector (ECD) to measure the presence of molecules, including pollutants, "revolutionized our understanding of the relationship between human activities and the environment" and still is used today (Gribbin and Gribbin 112). The scientist disagrees with environmentalists that use the ECD to ban substances even if levels are low and not necessarily harmful, and he argues that substances like DDT also saved lives (Gribbin and Gribbin 119).
19. Disequilibrium, where there is energy transfer from high (warmer) to low (cooler) systems, would indicate life was present. Lack of energy flow, where there is high equi-

librium, would indicate no life. When Congress's funding of the Voyager mission to Mars ceased in 1965, Lovelock's experiments ended, yet in that same year, scientists in France used Lovelock's method and determined that life did not exist on Mars (Gribbin and Gribbin 137–40).

20. Diane Preston explains in *Before the Fallout: From Marie Curie to Hiroshima* that the creation of the atomic bomb began with Curie's discovery of radium.
21. See *La ridícula idea*, pp. 209–10, for a list of sources Montero cites for her research on Curie.
22. Like Montero, Goldsmith also highlights Curie's many first-woman achievements (16–17).
23. Goldsmith critiques biographies that focus only on Curie's scientific work or gloss over hardships; she instead deconstructs the Curie legend that women can "do it all—and perfectly" (145). Montero praises Goldsmith for addressing the work-family pressure Curie experienced (*La ridícula idea* 95).
24. The text proposes that women and men approach relationships differently, women with idealized romanticism (61).
25. While Serra-Renobales focuses on Matías and the other male characters in this novel and I focus more on Cerebro, we both conclude that solidarity, acceptance, and inclusion underpin Montero's proposal of a better world (76). Though outside this essay's focus on women scientists, it is worth noting that because Matías assists a trafficked young woman from Senegal to escape entrapment, she gives birth to a son who will become an environmental scientist who studies oceanic methods to mediate global warming.
26. With this comment, Cerebro also suggests her affinity with Sheldrake, who asserts that "the past is potentially present everywhere, and that . . . we tune into or access aspects of past experience" (Kyzer 50:14–50:34).
27. For a more complete analysis of a care-based model of ecological sustainability in *Lágrimas en la lluvia* and *El peso del corazón*, see Leone.
28. Beilin also argues that Bruna Husky might be read in light of Haraway's cyborg figure. Haraway explains that Chela Sandoval introduces the term "oppositional consciousness" to describe a conscious, unifying political identity that does not totalize or assume natural categories ("A Cyborg Manifesto" 479–80, 490).
29. Beilin asserts that because androids cannot become biological mothers, they might better "resist cultural codes that lead us to destroy nonhuman life" (252). Leone also cites Beilin on this point in "Trans-species Collaborations."
30. Bruna blew off one of her arms with a plasma gun to free herself from a fallen tree during a chase. Promising her arm to Mirari transforms Bruna's fatalistic perspective into lightness, felt in "lo poco que pesaba un corazón feliz" (*El peso* 371; "how little a happy heart weighed" [*Weight* 312]; Leone 76).
31. Brief mentions of Labari in the series' third novel suggest that Bruna's actions do not finish this discriminatory polity.
32. We see the same with Cerebro, who has no children but supports Matías. Curie's struggles to care for her children and dedicate herself to her lab are discussed earlier in this piece.

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