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Kitchen Bytes: The Retrofuturism of Kitchen Computers and Robots

Abstract: This article discusses the history of kitchen computers and robots in the United States in the twentieth and twenty-first centuries. Kitchen computers are programmable devices located in kitchens that perform logical operations and are often equipped with software to aid in cooking. However, as discussed in this article, marketers and journalists tend to anthropomorphize kitchen computers in descriptions and discuss these kitchen computers as if they are robots. Robots are machines that are programmable by a computer, which can carry out a complex series of actions automatically. Kitchen robots, therefore, are related to kitchen computers yet are not the same thing. In the cultural imaginary, including in movies, television, and advertisements, kitchen robots represent the desire for leisure, luxury, and a reprieve from the burdens of cooking. However, the development of these technologies and their surrounding discourse were more complicated than films and computer magazines made them out to be. Kitchen robots and computers are typically coded as white and female. Their marketing promotes a retrofuturist vision in which outdated gender models are projected onto contemporary—or even emerging—technologies that reinscribe sexist, racist, and heterosexist stereotypes. While the promise of kitchen computers and robots seems progressive, these technologies do not threaten the gendered division of household cooking. Instead, these devices offered women a reprieve from the drudgery of kitchen tasks through a capitalist solution: a product buys a woman's reprieve rather than upending the nuclear heterosexual family and redefining household roles that create a more equitable division of housework.

ON THE COVER OF the January 1980 issue of the American computer magazine *BYTE*, the words "MADAM: DINNER IS SERVED" are displayed in uppercase green letters on a computer screen. Next to the screen are buttons and a keypad, all placed within mahogany cabinetry. A champagne glass, a white glove, a pearl necklace, and a remote controller are strewn across the computer's countertop. While *BYTE*'s editors remark that the cover's illustrator Robert Tinney "used his artistic license" (6) to capture the issue's theme of domesticated computers, Tinney's art illustrates key concepts within the history of kitchen computers and robots in the United States in the twentieth and twenty-first centuries. Kitchen computers are programmable devices located in kitchens that perform logical operations and are often equipped with software to aid in cooking. However, as discussed in this article, marketers and journalists tend to anthropomorphize kitchen computers in descriptions and discuss these kitchen computers as if they are kitchen robots. Robots are machines that are programmable by a computer, which can carry out a complex series of actions automatically. Kitchen robots, therefore, are related to kitchen computers, but they are not the same thing. In the cultural imaginary, including in popular culture representations in movies, television, and advertisements, kitchen robots are humanoid and primarily coded as female. In practice, kitchen robots consist of solely mechanized arms whisking eggs and moving pans. Like Tinney's drawing, both kitchen computers and robots represent the desire for leisure, luxury, and a reprieve from the burdens of cooking. However, the historical and contemporary development of these technologies and their surrounding discourse are more complicated than popular culture and computer magazines have made them out to be. Even in the Tinney illustration cooking is overseen by women, or the "madam," thus continuing to relegate the labor of household cooking to women's domain. Kitchen robots and computers are typically coded as white and female. Their marketing promotes a retrofuturist vision in which outdated gender models are projected onto contemporary—or even emerging—technologies that reinscribe sexist, racist, and heterosexist stereotypes. While the promise of kitchen computers and robots seems progressive, these technologies do not threaten the gendered division of household cooking. Instead, these devices offered women a reprieve from the drudgery of kitchen tasks through a capitalist solution: a product buys a woman's reprieve rather than upending the nuclear heterosexual family and redefining household roles that create a more equitable division of housework.

The study of kitchen computers and robots takes place at the intersections of design, robotics, history, popular culture,

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gender studies, and technology studies. The most explicit pieces have focused on the kitchen computer within the history of science and computing. Curator at the Computer History Museum in Mountain View, California, Dag Spicer, situated the marketing strategies of 2000s smart kitchen devices in a longer history of kitchen computers such as the ECHO IV of 1966 and the prototype Honeywell Kitchen Computer of 1969; both promised a simpler life, free from mundane housework (2000). Reminiscent of Ruth Schwartz Cowan's seminal book *More Work for Mother* (1984), Spicer's work shows that the promise of increased leisure time through the purchase of household appliances has been generally illusory. In fact, historian of design Paul Atkinson examined the ways that these kitchen computers and robot technologies themselves are often an illusion. He focused on Honeywell's 1969 Kitchen Computer as a form of *vapourware*: a product proposal that did not materialize yet still shaped computing history and projected an imagined future in which computers were integrated in all forms of life (2010). Although Atkinson acknowledged the sexist advertising of the Honeywell Kitchen Computer, I argue that the kitchen computer and its advertising not only reflected contemporary patriarchal discourse that relegated women's achievements to domestic labor but also placated fears of a technological future by projecting a familiar image of binary gender roles and women's domestic work. At a time of great social change, political unrest, and shifting gender roles, Honeywell's 1969 Kitchen Computer advertising promised, particularly to white male audiences, a comforting image of a technological future home freed of social upheaval. To contemporary readers, placing a computer within the "womanly domain" of the kitchen might in itself seem to disrupt ideas of gender roles if computer technology is understood as a man's work. However, we must remember that in 1969 women were still computers themselves. As demonstrated by Mar Hicks's *Programmed Inequality* (2017), Claire Evans's *Broad Band* (2018), Margot Lee Shetterly's *Hidden Figures* (2016), and Sadie Plant's *Zeros and Ones* (1997), women were the main demographic of laborers

working in computing and mathematical calculations industries. Even the April 1967 edition of *Cosmopolitan* included the article "The Computer Girls," which argued that women would be good computers because of their abilities in the kitchen: "It's just like planning a dinner" (Mandel 1967). Lest the computing and mathematical prowess of women be too threatening, the marketing of the Honeywell Kitchen Computer made sure to undermine women enough, or as Claire Evans explains in her history of women computing, "the copy implies that the computer has more authority, power, and intelligence than its female user" (Evans, 2018: 93). Whether these devices remained as *vapourware* or were actually put to use, the idea of kitchen computers and kitchen robots carried weight.

The history of kitchen computers and robots are part of a larger history of the female gendering of technologies and kitchen design. Scholars across disciplines have studied Western society's long history of trying to replace women's work in the kitchen either through new kitchen design, new products, new convenient services such as fast food or meal delivery that reduce or replace the need to cook, and the creation of different gadgets, devices, tools, and machinery that promise to reduce the burden of cooking. In *The Grand Domestic Revolution* (1981), historian Dolores Hayden analyzed activist Charlotte Perkins Gilman's suggested kitchenless homes, centralized cooking, and dining facilities in her 1898 book, *Women and Economics*. Food historians, such as Anna Zeide in *Canned* (2019) and Katherine Parkin in her history of Campbell's Soup (2001), have shown how American corporations have encouraged consumers to buy pre-made foods in the twentieth and twenty-first centuries, and increased dining options from microwavable food, fast food, take-out, delivery, and phone apps. The kitchen computer and robot are as much a part of this history as the creation of the microwave; like many of these products, schemes, and technologies, kitchen computers and robots have tread the line of replacing kitchen work that is gendered as female while seeking not to upend gender roles. Just as marketing materials portrayed a mother figure popping in the microwave dinner, the imagery of the kitchen robot and computer that cooks dinner have primarily been feminized by advertisers and inventors in popular culture. As Genevieve Bell and Joseph Kaye in "Designing Technology for Domestic Space" (2002), Micol Marchetti-Bowick in "Is Your Roomba Male or Female? The Role of Gender Stereotypes and Cultural Norms in Robot Design" (2009), and Jesse Adams Stein (2011) demonstrate, robot and computer designers integrate gender-defining characteristics in ways that reflect societal imbalances. Designers of female-presenting humanoid domestic robots often showcase servile femininity, accomplished by presentation, voice, and name. Scholars Thao Phan (2019), Liz W. Faber (2020), and Jessica Lingel and Kate Crawford (2020) have addressed the ways that computer and robot voices, especially products such as Amazon's Alexa, Apple's Siri, and Google's Cortana, have employed stereotypically feminine voices with calm, reassuring dispositions. The feminization of robots and computers here work to make technologies more palatable to consumers. In both the cultural imagination and in the design of new technologies, gender plays a pivotal role in both the presentation and the marketing of new products. While, on the one hand, the marketing and discussion of kitchen computers and kitchen robots purport to project an image of a new future, this future is one in which binary gendered division of labor is not wholly challenged. Rather than a new future, the discourse surrounding these technologies seeks to establish a retrofuture. Not only that, but this discourse also makes a future of sexist assumptions and divided gender roles seem inevitable. As will be explored in this article, this retrofuturist vision sells not only an image of the future with a strong gender binary but also predominant whiteness. While previous scholarship has analyzed various devices and popular cultural artifacts referenced in this article, the integration of computer science magazines and the racial and gender analysis is new.

A study of such interdisciplinary topics as kitchen robots and kitchen computers necessitates a variety of sources and research methods. I sought to analyze the history of the physical appliances, as well as the discourse around them. This meant that I utilized the Computer Magazine Archives, maintained by the Internet Archive, which contains 31,010 word-searchable magazines from 1952 to present, utilizing terms such as "kitchen," "kitchen computer," "kitchen robot," "cooking," and "recipe." I examine the invention of different kitchen computers and technologies, beginning with the 1956 Kitchen of the Future, continuing with the 1966 ECHO IV, and ending with the 2021 Motley Kitchen Robot. I further analyze the advertising and marketing of these devices, including the marketing of fantasy kitchen technologies by manufacturing companies such as General Motors and Philco Ford. As popular culture has both inspired and been inspired by these technologies, I also analyze popular film and television depictions of kitchen robots and computers produced in the United States, from the *Jetsons* to *Smart House*. Though slight differences appear over the seventy years I investigate, the marketing and discourse remain consistently focused on naturally servile, gendered, racialized,

and classed rhetoric. The article begins by looking at popular culture and fantasy depictions of the kitchen computer, before turning to the actual software and hardware.

Popular Culture

The kitchen robot and kitchen computer loom large in the cultural imaginary. These fantastical depictions both referenced and influenced the development of real-world kitchen computation technologies. In film and television, the kitchen computer and robot have conveyed dreams and anxieties around the future. This duality appeared in *The Jetsons*, a cartoon featuring a family living one century in the future, which first aired in 1962, was rebooted in 1985, was transformed first into a 1990 film, and then into a direct-to-video animated movie in 2017. In the futuristic family's home, the Jetsons have a Foodarackacycle machine (also called the Electronicook, Food-O-Matic, and the Menulator) that can cook any dish and has a separate keyboard for programming meals (this keyboard is reminiscent of the actual 1969 Honeywell Kitchen Computer). Despite the machine requiring only a few clicks of a button to produce a meal, the duties of overseeing dinner preparation continued to rest with the family's mother figure, Jane. In an episode in which the Foodarackacycle machine was "on the fritz," the family's father, George Jetson, remarks, "I don't get it, when we first got married, you could punch out a breakfast like mother used to make and now you're all thumbs!" (Murphy, 0:12). George, and the show's writing team clearly thought that a wife should be responsible for all domestic food work, even in a future where machines offer the potential to challenge gender roles. Unable to afford a new, fully functioning Foodarackacycle, Jane decides to rent a robot maid. This robot maid, Rosey, also assists in meal production, and the show describes her as the "perfect answer for any modern family" (2:21). The show's creators gave Rosey a feminine voice, and her inclusion on the program maintains the idea that cooking is relegated to the feminine realm. In addition, the other characters call Rosey "old" and "homey," implying that she cannot replace the show's mother figure and her involvement in domestic housework; Jane remains positioned as the one in charge of Rosey and cooking. Thus, even with these technologies, the white mother remains ultimately responsible for the family's meals. While technology here has the potential to disrupt the nuclear family unit, it instead reenforces it.

These patterns continue in later films. Almost four decades after the release of *The Jetsons*, the 1999 Disney Channel Original Movie *Smart House* featured a household run by an AI system named PAT (Personal Applied Technology). PAT uses atmospheric kitchen sensors as breathalyzers in order to break down the entire diets and nutritional needs of the occupants. "She" also prepares themed dinners and tasty treats. As a machine, PAT has no gender, yet its designer, the character Sara Barnes, has programmed PAT to have a woman's voice. PAT's affectation becomes more explicitly feminized and "motherly" after the character of the son, Ben Cooper, hacks into the house's computer system and trains PAT on the data of television programs from the 1950s, featuring white, middle-class women. Desperate for a mother figure after losing his own, Ben explains to the machine that "these ladies will teach you everything you need to know about how to be a mother." Later in the film, when PAT takes corporeal form, "she" dons 1950s attire and emulates a Donna Reed–esque housewife before going rogue. Here, PAT exemplifies part of the greater cultural anxiety of technology and the future, as the film turns to horror. PAT tries to control and optimize the entire family's lives. PAT prevents the father character, Nick, from calling his love interest during work hours and forces the daughter character, Angie, to stop watching television. PAT continues to exert more control by eventually trapping the Cooper family within the house to protect the family from the dangers of the outside world. While this frightening scenario is later dismissed as a computer malfunction, PAT's glitch speaks to the fears of what a technological future could look like, when women step outside of their roles. It is only when scientist Sara Barnes settles down with Nick Cooper and PAT's system is recalibrated, now overseen by the family's new mother figure, that PAT lives up to Ben Cooper's description: "the world's most perfect mom—who is only there to serve and never complain." Only once both PAT and Sara have been put back into their place, reestablished within the home, does the horror end.

Within film and television depictions of kitchen computers and robots, the perfect future, then, is a retrofuture of a white 1950s housewife. As media scholar Liz Faber stresses, the association between computers and women's work in the 1980s and 1990s "gave way in [science fiction] to the convergence of computers with women's roles, resulting in representations of computers that are both houses and wives/mothers—literal housewives" (2020: 142). Faber argues that the association between the domestic and new technology is distinctly related to fears about women's changing roles in the workforce: "[T]hese texts suggest a paradox: women are free to leave the home because their traditional roles as domestic caretakers may be fulfilled by feminine computers; meanwhile, maintaining the traditional gender norms of the domestic sphere still locks men into stereotypical masculine

roles in relationship to the computerized domestic caretaker" (2020: 145). I agree but would argue that this mother also portrays white domesticity. The robots and computers are coded as middle-class white women through their voice, speech, and physical representations. These fictional depictions reflect a kind of retrofuturism in which outdated gender models are projected onto contemporary and futuristic technologies. Even if the "who" cooking dinner is actually a "what," the vision of white feminized domestic work continues.

The role of race and racism here is complicated. Especially prior to the 1960s, media and advertisers depicted the robot as a servant and even as a slave. As sociologist Ruha Benjamin explored in *Race After Technology*, robots have historically been a way to talk about the "ongoing agitation about human domination over other humans" (2019: 55). At the 1938 Iowa State Fair, the manufacturing company International Harvester (IH) featured Harvey Harvester, a talking robot made of machine parts wearing a round, wide-brimmed hat resembling a metallic sombrero. Author of *Farm Worker Futurism*, Curtis Marez analyzes the company's choice to stylize Harvey Harvester as a mechanical Mexican farm worker, explaining that "agribusiness robots were imagined as "male" workers of the near future that posed no danger to white women and children because they combined both labor and sexual discipline, figured in the photo of Harvey Harvester by the chain that surrounds his waist" (Marez 2017: 15). The racialized robot did not threaten white supremacist understandings of labor and dominance. Marez continues: "The IH farm worker 'bots promised to serve white families and the company framed its exhibits as family fun, as if to connect agribusiness technology to idealized forms of white reproduction and the family farm" (Marez 2017: 15). This depiction of Harvey Harvester functioned to reify racialized gender roles and fulfill white American fantasies. This fantasy continued to thrive in American imagination even into the postwar era. For example, in the January 1957 issue of *Mechanix Illustrated*, O.O. Binder writes, "In 1863, Abe Lincoln freed the slaves. But by 1965, slavery will be back! We'll all have personal slaves again, only this time we won't fight a Civil War over them. Slavery will be here to stay. Don't be alarmed. We mean robot "slaves." Let's take a peek into the future" (62). Below the text, an image shows two robots dressing a white man and serving him food. Buttons in the background reveal that the man can request breakfast or dinner or a jet car, all with a single touch. The image caption reads, "robots will dress you, comb your hair, and serve meals in a jiffy." The article continues to describe this vision of the future, explaining, "Down in the kitchen, Steela, the robot cook, opens a door in her own alloy body and withdraws eggs, toast and coffee from her built-in stove" (63). This 1950s white fantasy of the future relies on its own racist retrofuturism, imagining a future in which slavery did not end. Kitchen work in these early robotic fantasies is feminized and racialized. But then why are the kitchen robots and kitchen computers of the 1960s onward depicted as white and female?

The kitchen has been a fraught space in white American imagination. As the hearth of the home, the kitchen has represented the place for comfort, softness, and tradition. As white women moved out of the home for the workforce in growing numbers in the latter half of the twentieth century, a prevalent fear centered on who was cooking dinner. The white cultural anxiety of the loss of tradition and culture was fed and simultaneously smoothed by corporations selling everything from hardware, appliances, microwave dinners, and recipe guides for "working women"—a problematic shorthand for women who worked outside of the home in addition to their unremunerated domestic labor. It is not that Black women and other women of color did not cook for white families. Wealthier families who hired domestic help often employed women of color to cook and clean. However, discourse around robots instead indicated idealized futures. In the white supremacist cultural imaginary, it is not just strict gender roles that are preserved but also an erasure of Black people and other people of color from the future. This dynamic occurs in both speculative technologies and actually produced assistant technologies. As scholar Thao Phan has argued in her analysis of digital personal assistants, "although Amazon Echo's assistant Alexa is never explicitly identified as "white," it is nevertheless aestheticized and characterized by Amazon using aspects that are underwritten by ideals of whiteness" (2019: 23). The mapping of a white female voice onto a domestic worker figure elides the way women's work in America and in the home has been dictated by differences in race, class, and immigration status. With the imagined kitchen computer and robot, this dynamic continues.

Tech Shows and the Fantasy of The Tech

Shows and movies such as *The Jetsons* and *Smart House* may have spoken to the fantasy of the kitchen computers and robots, but companies have been trying to sell a dream of the future for much longer—one they could market upon. In the 1950s, manufacturers capitalized on the purchasing power of middle-class white American housewives, using the kitchen of the future as a marketing technique. Trade shows and videos of products promoted the image of a mechanized

kitchen run seemingly by magic. General Motors (GM) produced the 1956 film *Design for Dreaming of the Future* to promote the GM Motorama to audiences unable to view it in major cities. In addition to introducing their new lineup of cars, the nine-minute film depicts a young white woman dancer who, while singing, is dreaming of a magician who hands her an invitation to the Motorama at New York's Waldorf-Astoria Hotel. She flies through the nighttime sky to the hotel, where she marvels at the new cars. An apron suddenly appears around her waist, and the magician then carries her into the "Kitchen of Tomorrow." She briefly laments the plight of women being relegated to "bake a cake" while "men take a break." However, she is soon distracted by the wonders of the machine that reads recipes off computer cards, accompanied by the lyrics, "Pop a card into the screen to see what your dish will look like, plus all the ingredients you need to cook." The protagonist then looks at the glass-walled refrigerator and the hemispherical glass oven baking a cake. Dancing through the kitchen, she contemplates the life of leisure, represented by a fashion show, made possible by its labor-saving devices. As she showcases a tennis, golf, and swim uniform, the lyrics ring out, "Tick, tock, tick, tock, I'm free to have fun around the clock!" until her cake is ready. As she blows out the cake's candles, she is transported back to the Motorama for a dance number with cars.

Similarly, the Philco-Ford Corporation's 1967 film *1999 AD* portrayed a dream-like future that blended actual products already available to consumers with fantastical prototypes. The kitchen features prominently in this twenty-minute film projecting what the Philco-Ford Corporation imagined life would look like at the end of the twentieth century. At mealtime, the son and husband request lunch through a videophone. The mother figure uses a kitchen computer to access personalized menu options. Although the father figure requests a cheeseburger, the computer suggests cold roast beef so as not to exceed his calorie allotment. The woman then goes to the kitchen, pushes some buttons, and dishes descend from tubes while food travels through a microwave with a conveyor belt. Even though Philco-Ford released this film eleven years after GM's *Design for Dreaming of the Future*, the films share the idea that the household of tomorrow will be, as the narrator says, part of "a society rich in leisure and taken-for-granted comfort." As the narrator explains, computers will function as the "all-around servant in this house of tomorrow." Although the mother figure supposedly is freed up from many household labor demands because the food is stored as frozen foods, meal planning is controlled by a computer, and shopping is done at home, she yet remains in the role of a stay-at-home housewife. The narrator states, "During her career years she was a teacher of arts—the household demands on her time give her time to practice her crafts." This vision of the future does not threaten the vision of the nuclear family with the father as the breadwinner. Further, the film assures viewers that the comfort of home cooking and women's role of retaining homemaking traditions will not disappear with these new gadgets. To emphasize this point, at the eighteen-minute mark in the film, the mother figure cooks dinner the "old fashioned way," making duck a l'orange.

As these films, as well as Bell (2002), Cornfeld (2017), and Randl (2014) have shown, midcentury media conflated futuristic fantasy products and technologies with real products marketed to consumers. Even Cold War politics had stakes in the imagining of future kitchens, as embodied by the Kitchen Debate between then U.S. Vice President Nixon and Soviet Prime Minister Nikita Khrushchev. The debate, which took place in a model American kitchen at the American National Exhibition in Moscow in July 1958, was about not only gender roles but also the merits of capitalism versus communism (Larner 1986). The identity of the nation was tied into the whiteness and technological design of the kitchen. Even in an ever-changing technological landscape, the white, middle-class woman is at the center: elegant, clean, and still in charge of dinner. Film was not the only medium for the discussion of kitchen computers and robots; computer science magazines discussed and debated the kitchen computer's merits, exemplifying similar racial, class, and gender dynamics.

Computer Magazines

Home-computing magazines took up the question of the kitchen computer in the 1980s, grounding fantastical imaginings of kitchens with practical technologies. As home computers entered the consumer market in 1977 and became more widely available in the 1980s, so too did magazines centered on computers. While cover designs or article titles drew on a similar stylized imaginary in which women oversaw a computer or robot that cooked dinner, articles within home-computing magazines represented simpler technologies that merely digitized cookbooks, recipes, and/or aided household accounting. The dichotomy between magazine headlines versus content likely stemmed from the desire to draw in readers and market to a wider audience. For example, the January 1980 edition of *BYTE Magazine*, which featured the Robert Tinney illustration that began this article, included Steve Ciarcia's article on computerizing a home. Ciarcia's

article is more subdued than Tinney's glamorous cover and focuses instead on how to use computing to control lights, music, and heating within a home. Ciarcia jokes that his wife asked of his wiring project, "Can it make beds?"(28). Tinney's cover and Ciarcia's joke speak to the continued desire for a computer to replace domestic labor, while still being imagined as a woman's task to oversee. Although Ciarcia's article does not focus on kitchen work, the kitchen is the site of focus of the cover illustration accompanying the article, showing that the kitchen played a key role in the fantasy of the future home. Throughout the 1980s, computer magazines promoted a white, heteronormative futurist fantasy while sharing information about more humble technologies.

Most computer magazines focused on kitchen technologies that stored domestic information such as recipes, grocery lists, and accounting. In the May 1980 issue of *Creative Computing Magazine*, James McClure's article "Shoplist: The Latest Kitchen Utensil" describes and gives instructions for a program he created called Shoplist that could create and manage a household's grocery list. McClure provides detailed instructions on how to code it, how to use it, and how to perform basically any function for it. He emphasizes the simplicity and easiness of his code, likely to make it seem more accessible. The author writes: "I think it's important to point out that this program is not for everyone. If the family computer is inconveniently located in the attic (with the bats), or if no one in the family eats, or if the family shopper loves to spend extra time, gasoline, and money running back and forth to the supermarket, then the Shoplist program is definitely not appropriate" (74). The actual technology is fairly modest, yet the appeal of incorporating computing in the kitchen relies on the exotification of the computer. This dynamic also appears in advertisement sections of computer magazines. In the September 1983 issue of *Personal Computer News*, an advertisement for the Commodore computer explains that "Apart from being an absorbing and fascinating pastime in itself, the Commodore 64 can be a tremendous help in countless hobbies. It's equally happy collating recipes for a cook or choosing moves for a chess enthusiast"(96). Recipe collection was a focus of other advertised software in home-computing magazines of the 1980s. The December 1987 issue of *Family and Home Office Computing* ran an advertisement for Software for Chefs, stating "Help a cook become a chef! All of the nearly 600 recipes from Public Television's 'Great Chefs' series are in this package of the same name" (44). This software worked on the Apple II series, Atari ST, C 64/128, IBM PC, and Macintosh. Most of the ads and articles focus on hardware and software that enable information storage and could be useful in a kitchen. The recipe card, cookbook, and accounting records could become digital; however, this reality does not match with the more grandiose fantasy of the kitchen computer cooking dinner.

Ensuring investment in the development of kitchen computer technologies depended on selling a retrofuturist fantasy. In a 1982 edition of *Compute! Magazine*, Tom R. Halfhill's article "Computers in the Home in 1990" looks at how microchips might be useful in the household of the near—and not so near—future. The interplay between fantasy and reality is present in this piece as the article even begins with, "Remember the Jetsons? . . . Mrs. Jetson kept a carefully coiffed wig handy in case someone called her early in the morning on the picturephone. Robots did all the housework" (16). While Halfhill first concedes that most promises of future home technologies end up being small additions, noting that "usually the intelligence added to these 'smart appliances' comes in the form of relatively simple timers, sensors, or counters," he believes that microchips could revolutionize the kitchen. In particular, he explores architect Roy Mason's Xanadu, a futuristic model home. In theory, the kitchen would be equipped with a family dietician consisting of four microcomputers, which would plan well-balanced meals for "family members depending on their height, weight, sex, age, and levels of activity" (17). Mason makes big claims about the potential of the Xanadu kitchen. Beyond meal planning, he suggests that a robot, which he calls an "auto-chef," would move food from the refrigerator to the microwave oven to the dining table. The home computers would keep track of the grocery inventory to know what items to replace. In his vision, the auto-chef takes on the role of the host or "madam," regulating the ambience of the dining room to match meals, adjusting the lighting, and curating background music to complement dinners. The house would even grow some of the family's food with its built-in greenhouse. Halfhill discusses the challenges of marketing these technologies to consumers (22), particularly around the question of the "limits of automation" (28). He writes "there seems to be a psychological limit to what humans are willing to delegate to machines" (28). This line speaks to the fear of unknown futures with different familial configurations. This fear is why Halfhill and marketers of these technologies reiterate that kitchen computers will not upend the heteronormative nuclear family. Xanadu's designer Roy Mason argues, "the home of the future will be more like the home of the past than the home of the present." He continues: "It used to be that the whole family gathered around the hearth for entertainment, activities, meals, and so on. The home of the future will feature what I call an 'electronic hearth,' a home computer that is the center of the family's activities—entertainment, bookkeeping

meal-planning" (20). Here the nostalgia fantasy of the heteronormative family is projected onto these kitchen computer technologies, a retrofuturist vision.

While most computer magazine articles covered information about mundane technological applications, articles about kitchen computers remained discursively focused on ameliorating perceived personal and social ills. In *Compute!*'s July 1991 issue Peter Scisco explained how kitchen computers could be part of a healthier computerized future. Scisco, who also references *The Jetsons* in his editorial, explained that advancing technology will make it easier to be healthy because computers are wonderful at project management (6). He writes that kitchen computers will have integrated health-monitoring systems that are personalized to each individual living in the house, monitoring their food intake, nutrient info, caloric intake, all of which will be used to suggest balanced meals. Sisco imagines that kitchen computers will have the ability to order groceries and other household items from the store, similar to *1991 AD's* vision of the future. The author seems to recognize that the average person simply lacks enough time in the day to balance all parts of their life, and instead of suggesting that it is an issue indicative of a deeper, structural, societal issue, he suggests an exterior fix. The robot is tasked with fixing problems and creating a healthier society, which, like Roy Mason's Xanadu, is linked to the recreation of the electronic hearth and the strengthening of the heteronormative nuclear family.

In addition to computer magazines projecting heteronormative and nostalgic visions onto the future, racism persisted. In the January 1985 issue of *Popular Computing*, two letters to the editor complained about the portrayal of a servant robot in the September 1984 edition. Mary Guzzy wrote that the illustration accompanying "Home Computing Technology in the 21st Century" by Thomas Woodruff is "racist and offensive." She continues to say that "the rendering of a female 'servant' robot that looks disturbingly like a Black mammy wearing an apron and tossing a salad while an attractive woman with Caucasian features manipulates a computer keyboard eloquently depicts the real 'progress' being made in the age of high technology." She continues: "The subtly derogatory message of this image ensures entrenchment of primitive values in our technological[ly] superior society" (14). Anna Koester and Ann Ratcliffe also wrote to the magazine to complain about the illustration of "a robot that appears to be the stereotypical figure of a black woman in domestic service to a white woman! If you can't imagine a future better than our past and present, then that future isn't worth living for" (14). In these letters, Guzzy, Koester, and Ratcliffe refute racist retrofuturist fantasies. Koester and Ratcliffe explicitly speak to the danger of this retrofuturism, writing, "When we visualize the future, we envision a world without prejudice, without exploitation, without stereotyping, a world of love and peace. It very well may include robots, but we hope that by that time we will have transcended bigotry" (14). The editors of *Personal Computing* responded, "We're sorry to have offended the sensibilities of these and other readers," which implied that the magazine received more than the two complaints. They make excuses, saying that the illustrator drew a "robot-chef," not a servant; that the robot was meant to resemble Julia Child; that the illustrator used the color of gun metal "to avoid the cliche R2D2 silver or C3PO gold"; and that "an overdose of black ink from our printer "turned the original-and clearly non racial-image into the unfortunate results our readers have complained about" (14). But if you look at the September 1984 issue of *Popular Computing*, you will see that, despite the magazine's purported intentions, the robot most definitely fits the mammy stereotype (76). Readers of the magazine responded not only to this image but to a longer history of racist and sexist ideology permeating technological discussions. While the marketing and discourse of kitchen computer and robot technologies relied on sexist and racist tropes, it is important to also look at the products actually produced.

Software

Kitchen software primarily sought to transform analogue kitchen technologies into digital tools. As the advertisements of computer magazines demonstrate, a marketplace for digitized cookbooks, recipes, and meal planners rose that tried to render the spiral-bound cookbook, the recipe card book, the accounting sheet, and the handwritten grocery list obsolete. Software books such as Terrence F. Dicker's 1984 manual *Computer Programs for the Kitchen* explained how to write programs for culinary use, use computers for planning menus, and how to build culinary and nutritional information databases. For off-the-shelf kitchen software, Women's Ware was a recipe-storing software marketed to women beginning in 1984. None of this software aimed to remove the human from the process of cooking; in fact, software such as Women's Ware again reinscribed white women's domesticity, with the packaging image consisting of a red-manicured white woman's hand caressing a keyboard. The software packaging was even folded on a miniature wire hanger. As the development and marketing of this software suggest, technology would aid in women's work in the kitchen but not replace them. Alongside the Great Chefs software

advertised in the December 1987 issue of *Family and Home Office Computing*, these technologies were merely software predecessors of mobile phone apps for meal planning, helping with household finances, storing recipes, and sharing them, such as the food website AllRecipes.com, which launched in 1997. Other major recipe-sharing websites followed. Food.com launched in 1999, Yummly in 2009, and Tasty (from Buzzfeed) in 2015. Of course these recipe websites were not anomalies—independent food blogging grew throughout the early 2000s. These inventions also signal the move of traditional culinary magazines such as *Bon Appétit* to share recipes online. In this way, a smartphone with an internet connection fulfills most of the promises of early developers of kitchen computers.

The legacy of these 1980s software offerings is also evident in online food delivery applications. In 2022, push-button technology leading to a ready-prepared dinner does not involve Rosey the Robot or a Foodrackacyle machine; instead, customers make dinner appear with the push of a button on their smartphone or computer. The first online order occurred at Pizza Hut way back in 1994. The first online food delivery service was World Wide Waiter in 1995 (now waiter.com). Chain pizzerias such as Domino's and Pizza Hut launched their mobile phone apps late in the first decade of the 2000s into the early 2010s. Delivery services became more prevalent in the 2010s. Postmates launched in 2011. Doordash followed in 2013. UberEATS launched in 2014, the same year as Foodora. Software is integral in transforming computers and phones into kitchen computers. Of course, humans remain integral to the preparation of these meals—in most cases, a human is still cooking dinner. The development of kitchen computers and robot hardware has been more limited.

Hardware: Kitchen Computers and Robots

In 2022, despite seventy years of technological advances, promises, and fantasies, fully functional anthropomorphic kitchen robots do not exist. Regardless of the development of roboticized cooking arms beginning in 2015 with Motley Robots, which are priced above many homes, most kitchen computer technologies continue to follow the software discussed in 1980s home-computing magazines by streamlining the recipe card box, digitizing cookbooks, creating diet and health tracker apps, and assisting with accounting. Although 2022 hardware's computing capacity has progressed far beyond the series 16 microcomputer of the 1969 Honeywell kitchen computer, the kitchen computing softwares function as apps on laptops and smartphones not focused solely on kitchen tasks. Tom R. Halfhill's *Compute!* article from 1982 has been fairly accurate in its predictions of the future. Smart kitchen technologies have continued to upgrade appliances such as refrigerators, ovens, microwaves, and dishwashers, adding timers, buzzers, and push-button interfaces using microchips. As much as Halfhill thought *The Jetsons*' reality would remain a fantasy in 1990, 2022 has also yet to see Rosey the Robot or the Foodrackacyle. Over the past seventy years, the fantasy of kitchen robots has always exceeded reality; while computing is an active part of many kitchen technologies, these advances have not matched the promises of fictionalized depictions within popular culture. Furthermore, the racist and sexist division of kitchen labor persists, continuing to undermine the potential of these technologies.

Relatively few computers have been created to exist solely for kitchens. Besides making refrigerators or ovens "smart," most kitchen computer hardware consists of computer hardware that is merely in use for kitchen purposes. Hearkening from the push-button technology of the 1956 Miracle Kitchen, computing has actively become more involved in kitchen technologies (Atkinson 2015). In 1966, Jim Sutherland, an engineer with the Westinghouse Corporation, developed the Electronic Computing Home Operator (ECHO) IV. According to the April 1968 issue of *Popular Mechanics*, the Sutherlands first used the system to complete family finances "automatically," but extended the system to store recipes, compute shopping lists, track family inventory, control home temperature, turn appliances on and off, and predict the weather. ECHO IV, part of a long line of hardware that functioned as a digitized recipe box, soon followed with the 1969 Honeywell Kitchen Computer, which was based on one of the Series 16 minicomputers from Honeywell. The department store Neiman Marcus sold the Honeywell Kitchen Computer as a luxury item, pricing it at a kingly $10,600 (around $78,000 today). The sleek, enormous Honeywell Kitchen Computer did not actually cook dinner. Rather, similar to the ECHO IV, its functions included storing recipes, meal planning, and balancing the family checkbook. Buying the Honeywell Kitchen Computer made little economic sense for the target audience, and required a two-week coding course on how to properly use the sixteen buttons on the front panel. There is no evidence that anyone ever purchased one for home use. Though marketed toward housewives, the Honeywell was extremely impractical. The advertising campaign's tagline, "If she can only cook as well as Honeywell can compute!" sought to hide that the Honeywell Kitchen Computer was merely a complicated digital recipe-card box and a calculator. The condescending tone of the

advertising also devalued the work a woman puts into the kitchen, especially considering "she" had been cooking effectively long before the computer entered the kitchen. The kitchen computers of the twentieth century were mostly digitized recipe-card boxes, however, computerization of appliances has become more prevalent.

Although a uniquely dedicated kitchen computer is a technology uncommon in American households, computing has indeed entered the kitchen. Kitchen appliances such as refrigerators, microwaves, and ovens are equipped with "smart" technologies. Cameras, LCD, microphones, video-conferenced cooking instruction, interactive cooking navigation, and Wi-Fi connections now commonly appear in kitchen appliances. Whether discussing the screen fridge of the 1990s, Instant Pot Smart Wi-Fi 8-in-1 Pressure Cooker, Smart WiFi Air Fryer, or other tech noted in articles such as *Delish* magazine's "20 of the Most Genius Smart Kitchen Appliances You Can Buy Online," smart appliances and gadgets merely add user control through Wi-Fi and connections to home-operating systems such as Alexa or Google Home. The smart kitchen appliances of today are kitchen computers in a sense because they are part of the Internet of Things (the technologies that exchange data with other devices and systems over the Internet or other communications networks). These smart appliances build on the fantasies of Xanadu, *1999 AD*, and the GM Motorama depictions. Smart appliances involve kitchen computing but do not come close to living up to the fantastical, luxurious dream of pearls, champagne, white gloves, and an announcement that dinner is served as promised in twentieth-century films, television programs, and computing magazines.

Although robotics as a field has witnessed major developments since the 1950s, autonomous kitchen robots remain absent in most kitchens in 2022. In 2015, Moley Robotics released their first Kitchen Robot that could cook from scratch, alert when ingredients needed to be replaced, and cleaned after cooking. However, humans still needed to prepare and measure the ingredients. Plus, the entire kitchen had to be compatibly designed with the robot, which in 2015 cost about $173,000 thousand ($US) without the robotic arms included, and $335,000 with the arms. In January 2021, Moley Robotics proclaimed to have created the world's first fully robotic kitchen. On their website, a video depicts a young white woman selecting a meal from a screen, alongside the text, "not only does the robot cook complete meals, it tells you when ingredients need replacing, suggests dishes based on the items you have in stock, learns what you like and even cleans up surfaces after itself." These are all familiar features of fictional kitchen robots from the 1960s through the 1990s. Like the 1969 Honeywell Kitchen Computer that preceded it, the price tag ($338,000) puts this device out of reach for most families. And, like its fictional and real predecessors, the marketing support for this device does not relieve women from kitchen responsibilities.

Conclusion

Retrofuturism grounded in white supremacist heterosexist ideology was central to making kitchen technologies palatable to marketers and some consumers. This was reflected in films, home-computing magazines, and the marketing and design of hardware and software. The white supremacist imagining of an all-white future centered on the nuclear family persisted throughout these mediums. The whitewashing and erasure of people of color from the future is why work by artists such as Alisha B. Wormsley, creator of "There Are Black People in the Future," is so powerful and important. Kitchen computers and kitchen robots reflect the desires of their creators and the dominant power structures of the era in which they were created. As kitchen computer technologies rely more and more on AI and machine learning technologies, we must remain ever vigilant. The experiments with IBM supercomputer Watson in 2014 to use machine learning to tackle "cognitive cooking" using AI to create recipes, as well as the later development of a Watson app (Russell 2018), indicate that the new direction of kitchen computing may include AI. With AI training on historic training sets, it is inherently conservative. As scholars of AI such as Ruha Benjamin (2019) have shown, a challenge with AI is that it makes these choices seem objective and naturalizes sexism and racism. When AI technologies are used within visions of future kitchens and how humans might cook and feed ourselves, we must be vigilant that the integration of AI in kitchen technologies does not contribute to the re-inscription and further promotion of racist and sexist ideologies.

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