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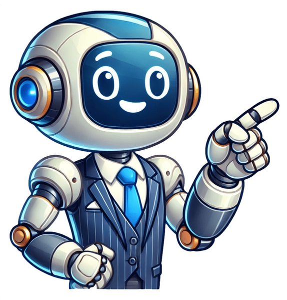

Induction stoves have become increasingly popular in recent years due to their efficiency and safety features. But how do they work? Induction stoves use electromagnetic induction to heat up the cookware directly, instead of heating up the surface of the stove. This means that the heat is more precise and can be controlled more easily, making it a popular choice for professional chefs. When an induction stove is turned on, an alternating electric current passes through copper heating coils installed underneath its flat glass or ceramic surface. This creates a magnetic field that interacts with the iron molecules in the cookware, causing them to vibrate and generate heat. The heat is then transferred directly to the food, making the cooking process faster and more efficient. Additionally, since the heat is generated in the cookware itself, the surface of the stove remains cool to the touch, reducing the risk of accidental burns. What is an Induction Stove? An induction stove is a type of electric stove that uses electromagnetic induction to heat up cookware. Unlike traditional electric or gas stoves, induction stoves do not use a heating element to transfer heat to the cookware. Instead, they use a magnetic field to create an electrical current in the cookware, which generates heat. The Basics of Induction Cooking Induction cooking works by creating an electromagnetic field between the cookware and the stove's induction coil. When the cookware is placed on the stove, the magnetic field induces an electrical current in the cookware, which generates heat. The heat is then transferred to the food inside the cookware. One of the benefits of induction cooking is that it heats up the cookware quickly and efficiently. Because the heat is generated directly in the cookware, there is no need to preheat the stove. Induction stoves also offer precise temperature control, allowing you to cook food at a specific temperature without the risk of overheating. Another benefit of induction cooking is that it is safer than traditional electric or gas stoves. Because the heat is generated directly in the cookware, the stove surface remains cool to the touch, reducing the risk of burns. Additionally, induction stoves automatically shut off when the cookware is removed from the stove, reducing the risk of accidental fires. However, it's important to note that not all cookware is compatible with induction stoves. Only cookware made from magnetic materials, such as cast iron or stainless steel, will work with induction stoves. Cookware made from aluminum, copper, or glass will not work. How Does an Induction Stove Work? An induction stove is a modern appliance that uses electromagnetic induction to heat cookware. It works differently from traditional gas and electric stoves, and has several advantages over them. In this section, we'll explore how an induction stove works, the science behind it, and the components that make it possible. The Science Behind Induction Cooking Induction cooking works by creating a magnetic field that induces an electric current in the cookware. This current generates heat, which cooks the food. The key to this process is the use of magnetic materials in the cookware. When the magnetic field interacts with the cookware, it creates a flow of electrons that generates heat. The Components of an Induction Stove An induction stove has several components that work together to create the magnetic field and heat the cookware. These components include: Power Supply: The power supply provides the electrical energy needed to create the magnetic field. It converts the AC power from the wall outlet to the high-frequency AC power needed for induction cooking. Coil: The coil is a copper wire that is wound into a spiral shape. When electricity flows through the coil, it creates a magnetic field. Control Circuit: The control circuit regulates the power supply to control the strength of the magnetic field. It also monitors the temperature of the cookware to prevent overheating. The Cooking Process on an Induction Stove To cook on an induction stove, you need to use cookware that is compatible with induction cooking. This means that the cookware must be made of a magnetic material, such as cast iron or stainless steel. Once you have the right cookware, you can start cooking by following these steps: Place the cookware on the induction stove's cooking surface. Turn on the stove and select the desired temperature. The stove will create a magnetic field that induces an electric current in the cookware. The cookware will heat up, and the food inside will start cooking. Adjust the temperature as needed to cook the food to perfection. Induction cooking is faster and more efficient than traditional gas and electric cooking. It heats up faster, uses less energy, and provides precise temperature control. With an induction stove, you can cook your meals more quickly and enjoy better results. Advantages of Using an Induction Stove An induction stove is a modern cooking appliance that uses electromagnetic energy to heat cookware. Unlike traditional gas and electric stoves, induction stoves have several advantages that make them a popular choice among homeowners. Energy Efficiency Induction stoves are highly energy efficient. They use up to 90% of the energy they consume to heat the cookware, compared to gas and electric stoves which only use 40-50% of their energy. This means that an induction stove can cook food faster and use less energy than traditional stoves. Additionally, because the heat is generated directly in the cookware, there is less heat loss, which means less wasted energy and a cooler kitchen. Speed and Precision Induction stoves heat up quickly and provide precise temperature control. They can boil water in half the time of a gas stove and can be adjusted to a specific temperature, making them ideal for cooking delicate dishes that require precise temperature control. Induction stoves also cool down quickly, which means less time waiting for the stove to cool before cleaning. Safety Induction stoves are safer than traditional stoves. Because the heat is generated directly in the cookware, the stove surface remains relatively cool, reducing the risk of burns. Additionally, induction stoves have safety features such as automatic shut-off and hot-burner warning lights that alert users to hot surfaces. Induction stoves are also less likely to cause fires because there is no open flame. Ease of Maintenance Induction stoves are easy to clean and maintain. Because the surface remains relatively cool, spills and splatters are less likely to burn onto the surface, making them easier to clean. Additionally, because there are no grates or burners, there are fewer parts to clean and maintain. Disadvantages of Using an Induction Stove While induction stoves offer many benefits, they also have some disadvantages that should be considered before making a purchase. Here are some of the most significant drawbacks of using an induction stove. Compatibility with Cookware One of the most significant disadvantages of induction stoves is that they require specific types of cookware to work. Only pots and pans made of ferrous metals, such as cast iron and stainless steel, can be used with induction stoves. Cookware made of copper, aluminum, or glass will not work on an induction stove. This can be a problem for those who have invested in high-quality cookware that is not compatible with induction cooking. Cost Another disadvantage of induction stoves is their cost. Induction stoves are generally more expensive than traditional gas or electric stoves. Additionally, the cost of purchasing new cookware that is compatible with induction cooking can add to the overall expense. Noise Induction stoves can also be noisy. The high-energy transfer from the coil to the pan can cause a rattling or whirring sound. While this sound is not harmful, it can be annoying to some users. However, some induction stoves are designed to be quieter than others, so it is essential to research the specific model before making a purchase. Conclusion Induction stoves are a modern and efficient way of cooking that use electromagnetic induction to heat pots and pans. They are a safer and more energy-efficient alternative to traditional gas and electric stoves. Induction stoves are also easy to clean, as there are no grates or burners to clean and no gas or oil spills to worry about. They are also more precise, as the heat is generated directly in the cookware, allowing for better temperature control. While induction stoves may be more expensive than traditional stoves, they are a worthwhile investment for those who want a safer, more efficient, and more precise cooking experience. Additionally, as technology improves, the price of induction stoves is likely to come down, making them more accessible to a wider range of consumers. Overall, induction stoves are a great option for those who want a modern, efficient, and safe way of cooking. With their many benefits, it's no wonder they are becoming increasingly popular in kitchens around the world. , the free encyclopedia that anyone can edit. 117,922 active editors 6,998,799 articles in English An RATP Group electric Heuliez Bus shuttles athletes from the Olympic Village. Transportation during the 2024 Summer Olympics and Paralympics constituted a major challenge for the organisers due to the scale of the event. Over €500 million was invested in improvements to transportation infrastructure for the games. A mobile app was developed to facilitate travel by offering a route calculator, and 5,000 agents were deployed at stations and bus stops to assist travellers. A goal of Paris 2024 was to halve the average carbon footprint of the London 2012 and Rio 2016 games. The organisers estimated that more than a third of the greenhouse gas emissions would be from the transport of athletes and spectators. All venues were made accessible by public transport and bicycle, with 415 kilometres (258 mi) of cycle paths created to link the venues and 27,000 bicycle racks installed. Public transport was extended and services increased. The goal was met, with an estimated 54.6% reduction, representing 1.59 million tonnes of CO2 equivalent. (Full article...) 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Augustine of Canterbury (d. 604)Isaac Franklin (b. 1789)Jeremy Corbyn (b. 1949)Elizabeth Peer (d. 1984) More anniversaries: May 25 May 26 May 27 Archive By email List of days of the year About Tom Cruise Top Gun: Maverick, a 2022 American action drama film directed by Joseph Kosinski, garnered accolades in a variety of categories, with particular recognition for Tom Cruise's (pictured) performance as well as its sound and visual effects, cinematography, and film editing. It received six nominations at the 95th Academy Awards, including Best Picture, and won Best Sound. At the 76th British Academy Film Awards, The film was nominated for Best Cinematography, Best Editing, Best Sound, and Best Special Visual Effects. Maverick received six nominations at the 28th Critics' Choice Awards and won Best Cinematography. It garnered two nominations at the 80th Golden Globe Awards. In addition to two National Board of Review Awards, Maverick was named one of the ten-best films of 2022 by the American Film Institute. (Full list...) Recently featured: National preserve 76th Primetime Emmy Awards Historic places in Mackenzie District Archive More featured lists The bluespotted ribbontail ray (Taeniura lymma) is a species of stingray in the family Dasyatidae. Found from the intertidal zone to a depth of 30 m (100 ft), this species is common throughout the tropical Indian and western Pacific Oceans in nearshore, coral reef-associated habitats. It is a fairly small ray, not exceeding 35 cm (14 in) in width, with a mostly smooth, oval pectoral fin disc, large protruding eyes, and a relatively short and thick tail with a deep fin fold underneath. It can be easily identified by its striking color pattern of many electric blue spots on a yellowish background, with a pair of blue stripes on the tail. This bluespotted ribbontail ray was photographed in the Red Sea off the coast of Egypt. Photograph credit: Diego Delso Recently featured: Black Lives Matter art Germanicus The Cocoanuts Archive More featured pictures Community portal – The central hub for editors, with resources, links, tasks, and announcements. Village pump – Forum for discussions about Wikipedia itself, including policies and technical issues. Site news – Sources of news about Wikipedia and the broader Wikimedia movement. Teahouse – Ask basic questions about using or editing Wikipedia. Help desk – Ask questions about using or editing Wikipedia. Reference desk – Ask research questions about encyclopedic topics. Content portals – A unique way to navigate the encyclopedia. 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Many other Wikipedias are available; some of the largest are listed below. 1,000,000+ articles العربية Deutsch Español فارسی Français Italiano Nederlands 日本語 Polski Português Русский Svenska Українська Tiếng Việt 中文 250,000+ articles Bahasa Indonesia Bahasa Melayu Bân-lâm-gú Български Català Čeština Dansk Eesti Ελληνικά Esperanto Euskara עברית Հայերեն Magyar Norsk bokmål Română Simple English Slovenčina Srpski Srpskohrvatski Suomi Türkçe Oʻzbekcha 50,000+ articles Asturianu Azərbaycanca Bosanski کوردی Frysk Gaeilge Galego Hrvatski ქართული Kurdî Latviešu Lietuvių Македонски Norsk nynorsk Shqip Slovenščina اردو Retrieved from " 2Award ceremony for films of 2022 "Oscars 95" redirects here. For the ceremony held in 1995, see 67th Academy Awards. For the ceremony for films released in 1995, see 68th Academy Awards. 95th Academy AwardsOfficial posterDateMarch 12, 2023SiteDolby TheatreHollywood, Los Angeles, California, U.S.Hosted byJimmy KimmelPreshow hosts Ashley Graham Vanessa Hudgens Lilly Singh[1] Produced by Glenn Weiss Ricky Kirshner Directed byGlenn WeissHighlightsBest PictureEverything Everywhere All at OnceMost awardsEverything Everywhere All at Once (7)Most nominationsEverything Everywhere All at Once (11)TV in the United StatesNetworkABCDuration3 hours, 37 minutes[2]Ratings 18.75 million[3] 9.9% (Nielsen ratings) ← 94th Academy Awards 96th → The 95th Academy Awards ceremony, presented by the Academy of Motion Picture Arts and Sciences (AMPAS), took place on March 12, 2023, at the Dolby Theatre in Hollywood, Los Angeles. During the gala, the AMPAS presented Academy Awards (commonly referred to as Oscars) in 23 categories honoring films released in 2022. The ceremony, televised in the United States by ABC, was produced by Glenn Weiss and Ricky Kirshner, with Weiss also serving as director. Comedian Jimmy Kimmel hosted the show for the third time, following the 89th ceremony in 2017 and the 90th ceremony in 2018.[4] In related events, the Academy held its 13th annual Governors Awards ceremony at the Fairmont Century Plaza Hotel in Century City, California, on November 19, 2022. The Academy Scientific and Technical Awards were presented by host Simu Liu on February 24, 2023, in a ceremony at the Academy Museum of Motion Pictures in Los Angeles.[5] Everything Everywhere All at Once won seven awards, including Best Picture.[6][7] Other winners included All Quiet on the Western Front with four awards, The Whale with two, and Avatar: The Way of Water, Black Panther: Wakanda Forever, The Boy, the Mole, the Fox and the Horse, The Elephant Whisperers, Guillermo del Toro's Pinocchio, An Irish Goodbye, Navalny, RRR, Top Gun: Maverick, and Women Talking with one. The telecast drew 18.75 million viewers in the United States.[3] The nominees for the 95th Academy Awards were announced on January 24, 2023, at the Samuel Goldwyn Theater in Beverly Hills, by actors Riz Ahmed and Allison Williams.[8] Everything Everywhere All at Once led all nominees with eleven nominations; All Quiet on the Western Front and The Banshees of Inisherin tied for second with nine nominations each.[9][10] The winners were announced during the awards ceremony on March 12, 2023. Everything Everywhere All at Once became the first science fiction film to win Best Picture,[11] and became the third film, alongside A Streetcar Named Desire (1951) and Network (1976), to win three acting awards.[12] Best Director winners Daniel Kwan and Daniel Scheinert became the third pair of directors to win for the same film.[a] For the first time since the 7th ceremony in 1935, all five Best Actor nominees were first-time nominees.[13] Michelle Yeoh became the first Asian winner for Best Actress and the second woman of color overall after Halle Berry, who won for her performance in Monster's Ball (2001).[14] Furthermore, she became the first woman to identify as Asian to be nominated in that category.[b] Ke Huy Quan became the first Vietnamese person to win an Oscar and the second Asian winner for Best Supporting Actor after Haing S. Ngor, who won for his role in The Killing Fields (1984).[15][16] The 42-year span between Judd Hirsch's first nomination, for his supporting role in Ordinary People (1980), and his second, for The Fabelmans, set the record for the longest gap between Oscar nominations.[13] At age 90, Best Original Score nominee John Williams became the oldest person nominated competitively in Oscars history.[13] Best Costume Design winner Ruth E. Carter became the first Black woman to win two Oscars.[17] Daniel Scheinert and Daniel Kwan, Best Picture co-winners, and Best Director and Best Original Screenplay winners Brendan Fraser, Best Actor winner Michelle Yeoh, Best Actress winner Ke Huy Quan, Best Supporting Actor winner Jamie Lee Curtis, Best Supporting Actress winner Sarah Polley, Best Adapted Screenplay winner Guillermo del Toro, Best Animated Feature co-winner Edward Berger, Best International Feature Film winner Daniel Roher, Best Documentary Feature Film co-winner Kartiki Gonsalves, Best Documentary Short Subject co-winner Volker Bertelmann, Best Original Score winner M. M. Keeravani, Best Original Song co-winner James Friend, Best Cinematography winner Ruth E. Carter, Best Costume Design winner Paul Rogers, Best Film Editing winner Joe Letteri, Best Visual Effects co-winner Eric Saindon, Best Visual Effects co-winner Winners are listed first, highlighted in boldface, and indicated with a double dagger (‡).[18] Best Picture Everything Everywhere All at Once – Daniel Kwan, Daniel Scheinert, and Jonathan Wang, producers‡ All Quiet on the Western Front – Malte Grunert, producer Avatar: The Way of Water – James Cameron and Jon Landau, producers The Banshees of Inisherin – Graham Broadbent, Peter Czernin, and Martin McDonagh, producers Elvis – Baz Luhrmann, Catherine Martin, Gail Berman, Patrick McCormick, and Schuyler Weiss, producers The Fabelmans – Kristie Macosko Krieger, Steven Spielberg, and Tony Kushner, producers Tár – Todd Field, Alexandra Milchan, and Scott Lambert, producers Top Gun: Maverick – Tom Cruise, Christopher McQuarrie, David Ellison, and Jerry Bruckheimer, producers Triangle of Sadness – Erik Hemmendorff and Philippe Bober, producers Women Talking – Dede Gardner, Jeremy Kleiner, and Frances McDormand, producers Best Directing Daniel Kwan and Daniel Scheinert – Everything Everywhere All at Once‡ Martin McDonagh – The Banshees of Inisherin Steven Spielberg – The Fabelmans Todd Field – Tár Ruben Östlund – Triangle of Sadness Best Actor in a Leading Role Brendan Fraser – The Whale as Charlie‡ Austin Butler – Elvis as Elvis Presley Colin Farrell – The Banshees of Inisherin as Pádraic Súilleabháin Paul Mescal – Aftersun as Calum Patterson Bill Nighy – Living as Mr. Rodney Williams Best Actress in a Leading Role Michelle Yeoh – Everything Everywhere All at Once as Evelyn Quan Wang‡ Cate Blanchett – Tár as Lydia Tár Ana de Armas – Blonde as Norma Jeane Andrea Riseborough – To Leslie as Leslie Rowlands Michelle Williams – The Fabelmans as Mitzi Fabelman Best Actor in a Supporting Role Ke Huy Quan – Everything Everywhere All at Once as Waymond Wang‡ Brendan Gleeson – The Banshees of Inisherin as Colm Doherty Brian Tyree Henry – Causeway as James Aucoin Judd Hirsch – The Fabelmans as Uncle Boris Barry Keoghan – The Banshees of Inisherin as Dominic Kearney Best Actress in a Supporting Role Jamie Lee Curtis – Everything Everywhere All at Once as Deirdre Beaubeirdre‡ Angela Bassett – Black Panther: Wakanda Forever as Queen Ramonda Hong Chau – The Whale as Liz Kerry Condon – The Banshees of Inisherin as Siobhán Súilleabháin Stephanie Hsu – Everything Everywhere All at Once as Joy Wang / Jobu Tupaki Best Writing (Original Screenplay) Everything Everywhere All at Once – Daniel Kwan and Daniel Scheinert‡ The Banshees of Inisherin – Martin McDonagh The Fabelmans – Steven Spielberg and Tony Kushner Tár – Todd Field Triangle of Sadness – Ruben Östlund Best Writing (Adapted Screenplay) Women Talking – Sarah Polley; based on the novel by Miriam Toews‡ All Quiet on the Western Front – Edward Berger, Lesley Paterson, and Ian Stokell; based on the novel by Erich Maria Remarque Glass Onion: A Knives Out Mystery – Rian Johnson; based on characters created by Johnson and the film Knives Out Living – Kazuo Ishiguro; based on the original motion picture screenplay Ikiru by Akira Kurosawa, Shinobu Hashimoto, and Hideo Oguni Top Gun: Maverick – Screenplay by Ehren Kruger, Eric Warren Singer, and Christopher McQuarrie; story by Peter Craig and Justin Marks; based on the film Top Gun written by Jim Cash and Jack Epps Jr. Best Animated Feature Film Guillermo del Toro's Pinocchio – Guillermo del Toro, Mark Gustafson, Gary Ungar, and Alex Bulkley‡ Marcel the Shell with Shoes On – Dean Fleischer Camp, Elisabeth Holm, Andrew Goldman, Caroline Kaplan, and Paul Mezey Puss in Boots: The Last Wish – Joel Crawford and Mark Swift The Sea Beast – Chris Williams and Jed Schlanger Turning Red – Domee Shi and Lindsey Collins Best International Feature Film All Quiet on the Western Front (Germany) – directed by Edward Berger‡ Argentina, 1985 (Argentina) – directed by Santiago Mitre Close (Belgium) – directed by Lukas Dhont EO (Poland) – directed by Jerzy Skolimowski The Quiet Girl (Ireland) – directed by Colm Bairéad Best Documentary Feature Film Navalny – Daniel Roher, Odessa Rae, Diane Becker, Melanie Miller, and Shane Boris‡ All That Breathes – Shaunak Sen, Aman Mann, and Teddy Leifer All the Beauty and the Bloodshed – Laura Poitras, Howard Gertler, John Lyons, Nan Goldin, and Yoni Golijov Fire of Love – Sara Dosa, Shane Boris, and Ina Fichman A House Made of Splinters – Simon Lereng Wilmont and Monica Hellström Best Documentary Short Film The Elephant Whisperers – Kartiki Gonsalves and Guneet Monga‡ Haulout – Evgenia Arbugaeva and Maxim Arbugaev How Do You Measure a Year? – Jay Rosenblatt The Martha Mitchell Effect – Anne Alvergue and Beth Levison Stranger at the Gate – Joshua Seftel and Conall Jones Best Short Film (Live Action) An Irish Goodbye – Tom Berkeley and Ross White‡ Ivalu – Anders Walter and Rebecca Pruzan Le pupille – Alice Rohrwacher and Alfonso Cuarón Night Ride – Eirik Tveiten and Gaute Lid Larssen The Red Suitcase – Cyrus Neshvad Best Short Film (Animated) The Boy, the Mole, the Fox and the Horse – Charlie Mackesy and Matthew Freud‡ The Flying Sailor – Wendy Tilby and Amanda Forbis Ice Merchants – João Gonzalez and Bruno Caetano My Year of Dicks – Sara Gunnarsdóttir and Pamela Ribon An Ostrich Told Me the World Is Fake and I Think I Believe It – Lachlan Pendragon Best Music (Original Score) All Quiet on the Western Front – Volker Bertelmann‡ Babylon – Justin Hurwitz The Banshees of Inisherin – Carter Burwell Everything Everywhere All at Once – Son Lux The Fabelmans – John Williams Best Music (Original Song) "Naatu Naatu" from RRR – Music by M. M. Keeravani; lyrics by Chandrabose‡ "Applause" from Tell It Like a Woman – Music and lyrics by Diane Warren "Hold My Hand" from Top Gun: Maverick – Music and lyrics by Lady Gaga and BloodPop "Lift Me Up" from Black Panther: Wakanda Forever – Music by Tems, Rihanna, Ryan Coogler, and Ludwig Göransson; lyrics by Tems and Ryan Coogler "This Is a Life" from Everything Everywhere All at Once – Music by Ryan Lott, David Byrne, and Mitski; lyrics by Ryan Lott and David Byrne Best Sound Top Gun: Maverick – Mark Weingarten, James H. Mather, Al Nelson, Chris Burdon, and Mark Taylor‡ All Quiet on the Western Front – Viktor Prášil, Frank Kruse, Markus Stemler, Lars Ginzel, and Stefan Korte Avatar: The Way of Water – Julian Howarth, Gwendolyn Yates Whittle, Dick Bernstein, Christopher Boyes, Gary Summers, and Michael Hedges The Batman – Stuart Wilson, William Files, Douglas Murray, and Andy Nelson Elvis – David Lee, Wayne Pashley, Andy Nelson, and Michael Keller Best Production Design All Quiet on the Western Front – Production design: Christian M. Goldbeck; set decoration: Ernestine Hipper‡ Avatar: The Way of Water – Production design: Dylan Cole and Ben Procter; set decoration: Vanessa Cole Babylon – Production design: Florencia Martin; set decoration: Anthony Carlino Elvis – Production design: Catherine Martin and Karen Murphy; set decoration: Bev Dunn The Fabelmans – Production design: Rick Carter; set decoration: Karen O'Hara Best Cinematography All Quiet on the Western Front – James Friend‡ Bardo, False Chronicle of a Handful of Truths – Darius Khondji Elvis – Mandy Walker Empire of Light – Roger Deakins Tár – Florian Hoffmeister Best Makeup and Hairstyling The Whale – Adrien Morot, Judy Chin, and Annemarie Bradley‡ All Quiet on the Western Front – Heike Merker and Linda Eisenhamerová The Batman – Naomi Donne, Mike Marino, and Mike Fontaine Black Panther: Wakanda Forever – Camille Friend and Joel Harlow Elvis – Mark Coulier, Jason Baird, and Aldo Signoretti Best Costume Design Black Panther: Wakanda Forever – Ruth E. Carter‡ Babylon – Mary Zophres Elvis – Catherine Martin Everything Everywhere All at Once – Shirley Kurata Mrs. Harris Goes to Paris – Jenny Beavan Best Film Editing Everything Everywhere All at Once – Paul Rogers‡ The Banshees of Inisherin – Mikkel E. G. Nielsen Elvis – Matt Villa and Jonathan Redmond Tár – Monika Willi Top Gun: Maverick – Eddie Hamilton Best Visual Effects Avatar: The Way of Water – Joe Letteri, Richard Baneham, Eric Saindon, and Daniel Barrett‡ All Quiet on the Western Front – Frank Petzold, Viktor Müller, Markus Frank, and Kamil Jafar The Batman – Dan Lemmon, Russell Earl, Anders Langlands, and Dominic Tuohy Black Panther: Wakanda Forever – Geoffrey Baumann, Craig Hammack, R. Christopher White, and Dan Sudick Top Gun: Maverick – Ryan Tudhope, Seth Hill, Bryan Litson, and Scott R. Fisher The Academy held its 13th annual Governors Awards ceremony on November 19, 2022, during which the following awards were presented:[19] To Euzhan Palcy, a masterful filmmaker who broke ground for Black women directors and inspired storytellers of all kinds across the globe.[20] To Diane Warren, for her genius, generosity and passionate commitment to the power of song in film.[20] To Peter Weir, a fearless and consummate filmmaker who has illuminated the human experience with his unique and expansive body of work.[20] Michael J. Fox – "For his tireless advocacy of research on Parkinson's disease alongside his boundless optimism exemplifies the impact of one person in changing the future for millions."[21] Films with multiple nominations Nominations Film 11 Everything Everywhere All at Once 9 All Quiet on the Western Front The Banshees of Inisherin 8 Elvis 7 The Fabelmans 6 Tár Top Gun: Maverick 5 Black Panther: Wakanda Forever 4 Avatar: The Way of Water 3 Babylon The Batman Triangle of Sadness The Whale 2 Living Women Talking Films with multiple wins Awards Film 7 Everything Everywhere All at Once 4 All Quiet on the Western Front 2 The Whale The following individuals, listed in order of appearance, presented awards or performed musical numbers:[22] Presenters Name(s) Role Sylvia Villagran Served as announcer for the 95th Academy Awards[23] Emily Blunt Dwayne Johnson Presented the award for Best Animated Feature Ariana DeBose Troy Kotsur Presented the awards for Best Supporting Actor and Best Supporting Actress Cara Delevingne Introduced the performance of "Applause" Riz Ahmed Ahmir "Questlove" Thompson Presented the award for Best Documentary Feature Film and Best Live Action Short Film Halle Bailey Melissa McCarthy Presented the trailer for The Little Mermaid Michael B. JordanJonathan Majors Presented the award for Best Cinematography Donnie Yen Introduced the performance of "This Is a Life" Jennifer ConnellySamuel L. Jackson Presented the award for Best Makeup and Hairstyling Morgan FreemanMargot Robbie Presented the Warner Bros. 100 Years tribute Paul DanoJulia Louis-Dreyfus Presented the award for Best Costume Design Deepika Padukone Introduced the performance of "Naatu Naatu" Eva LongoriaJanet Yang Presented a montage promoting the Academy Museum of Motion Pictures Antonio BanderasSalma Hayek Pinault Presented the award for Best International Feature Film Elizabeth OlsenPedro Pascal Presented the awards for Best Documentary Short Film and Best Animated Short Film Hugh GrantAndie MacDowell Presented the award for Best Production Design John ChoMindy Kaling Presented the award for Best Original Score Elizabeth Banks Presented the award for Best Visual Effects Danai Gurira Introduced the performance of "Lift Me Up" Andrew GarfieldFlorence Pugh Presented the awards for Best Original Screenplay and Best Adapted Screenplay Kate HudsonJanelle Monáe Presented the award for Best Sound and Best Original Song John Travolta Presented the "In Memoriam" segment Zoe SaldañaSigourney Weaver Presented the award for Best Film Editing Idris ElbaNicole Kidman Presented the award for Best Director Halle BerryJessica Chastain Presented the awards for Best Actor and Best Actress Harrison Ford Presented the award for Best Picture Performers Name Role Work Rickey Minor Music director Conductor Orchestral Sofia Carson Diane Warren Performers "Applause" from Tell It Like a Woman David Byrne Stephanie Hsu Son Lux Performers "This Is a Life" from Everything Everywhere All at Once[24] Kaala Bhairava Rahul Sipligunj Performers "Naatu Naatu" from RRR Lady Gaga Performer "Hold My Hand" from Top Gun: Maverick Rihanna Performer "Lift Me Up" from Black Panther: Wakanda Forever Lenny Kravitz Performer "Calling All Angels" during the annual "In Memoriam" tribute Jimmy Kimmel hosted the 95th Academy Awards. In September 2022, the Academy hired television producers Glenn Weiss and Ricky Kirshner to oversee production of the 2023 ceremony.[25] AMPAS president Janet Yang and CEO Bill Kramer remarked that they looked "to deliver an exciting and energized show" with Weiss and Kirshner.[26] Two months later, comedian and talk show host Jimmy Kimmel was announced as host of the gala. "Being invited to host the Oscars for a third time is either a great honor or a trap," Kimmel stated in a press release regarding his selection. "Either way, I am grateful to the Academy for asking me so quickly after everyone good said no", he concluded.[27] Furthermore, AMPAS announced that all 23 categories would be presented live during the gala. The announcement came in response to an internal survey which indicated negative feedback regarding the previous year's decision to present eight below-the-line categories prior to the live portion of last year's gala.[28] In light of the Chris Rock–Will Smith slapping incident during the previous year's telecast, AMPAS announced that the organization hired a "crisis team" in the event a similar altercation or if an unexpected fiasco arose.[29] In an interview published by Time magazine, Kramer explained: "We have a whole crisis team, something we've never had before, and many plans in place. We've run many scenarios. So it is our hope that we will be prepared for anything that we may not anticipate right now but that we're planning for just in case it does happen."[30] The Dolby Theatre stage on the day of the ceremony Several others participated in the production of the ceremony and related events. Rickey Minor served as musical director for the ceremony.[31] Production designers Misty Buckley and Alana Billingsley, who were the first women-led design team for an Oscars telecast, designed a new stage for the show.[32] According to Buckley and Billingsley, the stage was designed to resemble Art Deco movie places from the Golden Age of Hollywood.[33] Additionally, the set utilized several LED panels that were used to display the category names, winners' names, or images from the nominated films.[34] Notably, the arrivals area along Hollywood Boulevard outside the Dolby Theatre was lined with a champagne-colored carpet, marking the first time since the 32nd ceremony in 1960 that a non-red colored carpet was utilized for the gala. According to red carpet consultant Lisa Love, the production team chose a lighter shade of carpet color in order to not clash with a sienna-colored tent erected to shield attendees from the sun or potential rain. She also added that the shades of color for both the carpet and tent were inspired by "watching the sunset on a white-sand beach at the 'golden hour' with a glass of champagne in hand, evoking calm and peacefulness".[35] Lady Gaga was initially not scheduled to perform her nominated song "Hold My Hand" from Top Gun: Maverick due to prior commitments involving her role in Joker: Folie à Deux. On the morning of the ceremony, however, it was reported that Gaga would perform at the ceremony.[36] Meanwhile, actress Glenn Close, who was originally scheduled as a presenter during the gala, canceled her appearance due to a positive COVID-19 test.[37] When the nominations were announced, nine of the ten films nominated for Best Picture had earned a combined gross of $1.57 billion at the American and Canadian box offices at the time. Top Gun: Maverick was the highest-grossing film among the Best Picture nominees with $718.7 million in domestic box office receipts.[38] Avatar: The Way of Water came in second with $598.4 million; this was followed by Elvis ($151 million), Everything Everywhere All at Once ($70 million), The Fabelmans ($15 million), The Banshees of Inisherin ($9 million), Tar ($5.6 million), Triangle of Sadness ($4.2 million), and Women Talking ($1.1 million). The box office figures for All Quiet on the Western Front were unavailable due to their distributor Netflix's policy of refusing to release such figures.[39] Furthermore, by virtue of Avatar: The Way of Water and Top Gun: Maverick's Best Picture nominations, it marked the first time since the 55th ceremony in 1983 that the two highest grossing films of the year were both nominated in the aforementioned category.[40] Andrea Riseborough's Best Actress nomination for To Leslie was controversial amongst critics and pundits, as Momentum Pictures, the film's distributor, did not fund a conventional advertising-driven awards campaign for the film. Instead, director Michael Morris and his wife, actress Mary McCormack, organized a "celeb-backed campaign" to get Riseborough nominated.[41][42] They contacted friends and colleagues in the entertainment industry, asking them to view the film and share it with others if they enjoyed it.[43] Morris and Riseborough also hired publicists to coordinate the efforts. While not initially regarded as a serious contender, the campaign raised Riseborough's profile; dozens of celebrities praised her performance on social media, and some hosted screenings of the film during voting for the Academy Award nominations in January 2023.[44][45] Riseborough's nomination was announced on January 24, which the Los Angeles Times called "one of the most shocking nominations in Oscar history".[43] After her nomination was announced, speculation arose that the tactics might have violated AMPAS rules against directly lobbying voters.[46] A post on the film's Instagram account was noted by several AMPAS members for possibly violating a rule prohibiting "[singling] out 'the competition' by name" by featuring a quote from film critic Richard Roeper, who praised Riseborough's performance as better than Cate Blanchett's in Tár, a fellow nominee for Best Actress.[47] On January 27, the Academy announced a review of the year's campaigns "to ensure that no guidelines were violated, and to inform us whether changes to the guidelines may be needed in a new era of social media and digital communication".[48] The Academy has rescinded nominations for nominees who participated in unsanctioned campaigning. However, there were no reports that Riseborough had been involved in such, or that any Academy members had lodged formal complaints about the campaign's behavior.[48] On January 31, the Academy concluded its review by pledging to address "social media and outreach campaigning tactics" which they said caused "concern", but confirming that Riseborough's nomination would be retained.[49] Following the controversy, the Academy introduced new campaigning rules and clarifications in May 2023.[50] Variety columnist Owen Gleiberman wrote: "It didn't rock the boat, it didn't overstay its welcome, and it left you feeling that the world's preeminent awards show, all doom-saying punditry to the contrary, is still, on balance, a very good thing." He also added that the wins received by Everything Everywhere All at Once "lent the evening a rare emotional unity".[51] Television critic Daniel Fienberg of The Hollywood Reporter similarly praised the show's emotional beats and found its flaws "were mitigated more gracefully than just about any Oscars telecast" he could recall.[52] Mick LaSalle of the San Francisco Chronicle commended Kimmel's stint as host stating: "He was establishing that 2023 would not be a repeat of 2022 — and it wasn't. It was such a relief to see something, anything, actually get better."[53] Mike Hale of The New York Times remarked on "the ordinariness and sameness of the ABC broadcast" compared to the prior year,[54] while USA Today's Kelly Lawler criticized it as "terribly fake" and felt that Kimmel's role "felt phoned in, or at least maybe monitored by corporate overlords looking to avoid controversy" despite some of his jokes tackling controversial subjects such as the January 6 United States Capitol attack and Tom Cruise's Scientology advocacy.[55] Hale added that "the modern Oscars have become something more to be endured than enjoyed".[54] The American telecast on ABC drew in an average of 18.75 million people over its length, which was a 13% increase from the previous year's ceremony and marked the first time that the Academy Awards experienced consecutive years of viewership increase since the 86th Academy Awards in 2014.[3] The show also earned higher Nielsen ratings compared to the previous ceremony with 9.9% of households watching the ceremony.[56] In addition, it garnered a higher 18–49 demo rating with a 4.03 rating among viewers in that demographic.[57] It was the most-watched prime time entertainment broadcast of 2023 in the United States.[58] In July 2023, the broadcast was nominated for three awards at the 75th Primetime Creative Arts Emmys but failed to win in any of the categories for which it was nominated.[59][60] The annual "In Memoriam" segment was introduced by John Travolta. Singer Lenny Kravitz performed his song "Calling All Angels" during the tribute.[61][62] Olivia Newton-John – singer, actress John Korty – director, producer May Routh – costume designer Louise Fletcher – actress John Zaritsky – cinematographer Albert Brenner – production designer Irene Papas – actress Mitchell Goldman – executive Bob Rafelson – director, writer, producer Albert Saiki – design engineer Ian Whittaker – set decorator Robbie Coltrane – actor Kirstie Alley – actress Ray Liotta – actor Vicky Eguia – publicity executive Angelo Badalamenti – composer Greg Jein – visual effects artist, model maker Neal Jimenez – writer, director Mike Hill – film editor Tom Luddy – producer, film festival co-founder Marina Goldovskaya – director, cinematographer, educator Christopher Tucker – special effects makeup artist Irene Cara – actress, singer, songwriter Gregory Allen Howard – writer, producer Owen Roizman – cinematographer Luster Bayless – costume designer Gray Frederickson – producer Robert Dalva – film editor Nichelle Nichols – actress Edward R. Pressman – producer Douglas McGrath – writer, director, actor Julia Reichert – producer, director Edie Landau – producer, executive Mike Moder – assistant director, producer Jean-Luc Godard – director, writer Ralph Eggleston – animator, production designer Marvin March – set decorator Burt Bacharach – composer Nick Bosustow – producer Clayton Pinney – special effects artist Simone Bär – casting director Donn Cambern – film editor Tom Whitlock – songwriter Amanda Mackey – casting director Angela Lansbury – actress Wolfgang Petersen – director, writer, producer John Dartigue – publicity executive Burny Mattinson – animator Maurizio Silvi – makeup artist Jacques Perrin – actor, producer, director Mary Alice – actress Gina Lollobrigida – actress Carl Bell – animator Douglas Kirkland – photographer Vangelis – composer, musician James Caan – actor, producer Raquel Welch – actress Walter Mirisch – producer, former President of the Academy List of submissions to the 95th Academy Awards for Best International Feature Film ^ Jerome Robbins and Robert Wise first achieved this distinction for co-directing West Side Story (1961). Brothers Joel Coen and Ethan Coen later earned this same feat for their direction of No Country for Old Men (2007).[12] ^ Many consider Merle Oberon, who was nominated for her role in The Dark Angel (1935), to be the first Asian nominee in this category, but she hid her mixed-race heritage due to fears regarding discrimination and the impact it would have on her career.[14] ^ Flam, Charna (March 3, 2023). "Vanessa Hudgens, Ashley Graham, Lilly Singh to Host ABC's Countdown to the Oscars Pre-Show". Variety. Archived from the original on March 6, 2023. Retrieved March 8, 2023. ^ Santilli, Tom (March 13, 2023). "Oscars 2023 Aftermath: A Safe and Focused Show Gets the Awards Show Back on Track". WXYZ-TV. Archived from the original on March 13, 2023. Retrieved April 25, 2023. ^ a b c "With Viewership Up 12% from Last Year, Oscars Win the Ratings Week". Los Angeles Times. March 15, 2023. Archived from the original on March 15, 2023. 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Academy Awards official website The Academy of Motion Picture Arts and Sciences official website Oscars Channel Archived February 26, 2019, at the Wayback Machine at YouTube (run by the Academy of Motion Picture Arts and Sciences) Other resources The Oscars (2023) at IMDb Retrieved from " 3 The following pages link to 95th Academy Awards External tools (link count transclusion count sorted list) · See help page for transcluding these entries Showing 50 items. View (previous 50 | next 50) (20 | 50 | 100 | 250 | 500)Academy Award for Best Production Design (links | edit) Academy Awards (links | edit) All Quiet on the Western Front (links | edit) Steven Spielberg (links | edit) Academy of Motion Picture Arts and Sciences (links | edit) Going My Way (links | edit) Irving G. Thalberg Memorial Award (links | edit) Jean Hersholt Humanitarian Award (links | edit) Academy Award for Best Dance Direction (links | edit) Academy Award for Best Assistant Director (links | edit) Academy Award for Best Story (links | edit) Academy Award for Best Picture (links | edit) Academy Award for Best International Feature Film (links | edit) Academy Award for Best Makeup and Hairstyling (links | edit) Academy Award for Best Supporting Actress (links | edit) Academy Award for Best Animated Feature (links | edit) Academy Award for Best Animated Short Film (links | edit) Academy Award for Best Live Action Short Film (links | edit) Academy Award for Best Cinematography (links | edit) Academy Award for Best Visual Effects (links | edit) Academy Award for Best Adapted Screenplay (links | edit) Academy Award for Best Costume Design (links | edit) Academy Award for Best Director (links | edit) Academy Award for Best Documentary Feature Film (links | edit) Jamie Lee Curtis (links | edit) Academy Award for Best Film Editing (links | edit) David Byrne (links | edit) Academy Award for Best Original Score (links | edit) Jeff Cohen (actor) (links | edit) Academy Award for Best Sound (links | edit) Network (1976 film) (links | edit) Academy Juvenile Award (links | edit) Michelle Yeoh (links | edit) Cate Blanchett (links | edit) Darren Aronofsky (links | edit) Academy Honorary Award (links | edit) Academy Award for Best Documentary Short Film (links | edit) Academy Award for Technical Achievement (links | edit) Sacheen Littlefeather (links | edit) Golden Raspberry Awards (links | edit) Robert Blake (actor) (links | edit) Frances McDormand (links | edit) Bond girl (links | edit) Jerry Bruckheimer (links | edit) Special Achievement Academy Award (links | edit) Jimmy Kimmel (links | edit) Brendan Fraser (links | edit) Cinema of India (links | edit) Judd Hirsch (links | edit) List of Academy Awards ceremonies (links | edit) View (previous 50 | next 50) (20 | 50 | 100 | 250 | 500) Retrieved from " WhatLinksHere/95th_Academy_Awards" by Chris Woodford. Last updated: August 18, 2023. Cooking is one of the oldest of technologies—and for obvious reasons: humans would never have survived (let alone thrived) without perfecting the art of feeding themselves. The basic idea of cookery—heating food to kill bacteria and make something nutritious and tasty—is fairly prehistoric: "food plus fire equals cooked food" is roughly how it goes. There's not an awful lot of difference between roasting a hunted animal on an open outdoor fire, as our ancestors would have done, and cooking it with electricity or gas in an oven, as we do today. [1] That's not to say there's been no progress in cooking technology. In the 20th century alone, ingenious inventors came up with two brand new forms of cooking. One, the microwave oven, uses high-energy radio waves to heat food quickly and efficiently in a fraction of the time you need with a conventional stove. The other, induction cooking, uses electromagnetism to turn cooking pans into cookers (creating heat energy inside the pan itself, instead of firing it in from outside), which cooks food more quickly and safely with less energy. Everyone knows about microwaves these days, but induction cookers are much less well understood. Let's take a closer look at exactly what they are, how they work, and whether they're better or worse than more familiar forms of cookery. Photo: Induction cooktops, made from easy-to-clean toughened glass, look much the same as other ceramic cooktops. It's important to know that only cookware with an iron base will work properly with a cooktop like this. Most new pots and pans are very clearly labeled and it's relatively easy to find cooking products that are compatible. Photo by Juhan Sonin published on Flickr under a Creative Commons Licence. Contents Before you can understand induction cooking, you need to understand induction. And the first thing you need to know is that "induction" is a shortened way of saying "electromagnetic induction." In a nutshell, induction means generating electricity using magnetism. It stems from the simple fact that electricity and magnetism aren't separate, unconnected things (as we originally learn in school) but two different aspects of the same underlying phenomenon: electromagnetism. Photo: James Clerk Maxwell, who described the science of electromagnetism in four equations. Public domain photo by courtesy of Wikimedia Commons. A handful of brilliant European scientists figured out the science of electromagnetism—the mysterious relationship between electricity and magnetism—in a period of roughly 40 years spanning the middle of the 19th century. Their findings have proved to be among the most important discoveries ever made: scientists had known about electricity since ancient times, but understanding the science (and technology) of electromagnetism made it possible to power the world with electricity for the first time. It all started in 1820. A Danish physicist named Hans Christian Oersted found that when an electric current flows down a wire, it creates an invisible pattern of magnetism all around it (a magnetic field, in other words). The next year, French physicist Andre-Marie Ampère took this experiment a stage further: he found that two wires carrying electric currents, placed near to one another, will either attract or repel one another—a bit like two magnets—because the magnetic fields they produce cause a force between them. So far, the emerging science of electromagnetism was completely theoretical: very interesting, but not much use. Things took a much more practical twist when the brilliant English physicist and chemist Michael Faraday figured out how he could use electricity and magnetism to develop a very primitive electric motor, also in 1821. He placed a magnet near a piece of wire into which he fed an electric current. As the current flowed through the wire, it generated a magnetic field around it (in the way Oersted had found), pushing itself away from the magnetic field that the permanent magnet generated. Other inventors (notably Englishman William Sturgeon and American Joseph Henry) went on to develop practical electric motors, while Faraday continued to experiment with the science. In 1831, he pulled off the opposite trick: he showed how rotating a coil of wire through a magnetic field would make an electric current flow through it—inventing the electricity generator that would soon (in the hands of pioneers such as Thomas Edison) bring electric power to the world. Animation: Move a magnet in and out of a coil, wired into a circuit, and you'll make electricity flow through it. This is a very simple example of electromagnetic induction—the basic principle behind electricity generators. The science of electromagnetism (how electricity can make magnetism and vice-versa) was finally nailed down by Scottish physicist James Clerk Maxwell in the 1860s. Maxwell summarized everything that was then known about electricity and magnetism in four beautifully simple, crystal clear, mathematical formulas. Maxwell's equations, as we now call them, still form the foundations of electromagnetic science today. Read more in James C. Rautio's article The Long Road to Maxwell's equations. You don't need to know much about electromagnetism to understand induction cookery—simply that a changing electric current can make magnetism and a changing magnetic field can make electricity. When you hear someone talking about induction, or something that uses induction, all it means is that magnetism is being used to generate electricity. A common use for induction is in electric toothbrushes, which have one or two rechargeable batteries packed inside. The trouble with electric toothbrushes is that they get wet, so they need to have completely sealed plastic cases to keep their mechanisms safe and dry. But that creates a different problem: if they're completely sealed against water, how can you get electricity inside to recharge them? A conventional charger socket would be an open invitation to water as well. That's where induction comes in. When your toothbrush battery runs flat, you sit it on a little plastic charger unit to recharge it. Although there is no direct electrical connection between the toothbrush and the charger (both are made of plastic), electromagnetic energy flows from the charger into the toothbrush battery by induction, straight through the plastic that separates them: a coil of wire in the charger produces a magnetic field that induces an electrical current in a similar coil in the base of the toothbrush. You can find out more (and see some diagrams of exactly how it all works) in our main article on induction chargers. Photos: Electric toothbrushes charge by induction: electromagnetic induction allows energy to flow from the (white) charger to the battery in the (dark blue) brush even though there is no direct electrical connection between them. How does an induction cooktop work? An induction cooktop (a cooktop is called a "hob" in European countries) is simply an electromagnet you can cook with. Inside the glass cooktop, there's an electronically controlled coil of metal. When you turn on the power, you make a current flow through the coil and it produces a magnetic field all around it and (most importantly) directly above it. Now a simple direct electric current (one that's always flowing in the same direction) produces a constant magnetic field: one of the laws of electromagnetism is that fluctuating magnetism is produced only by a constantly changing electric current. So you have to use an alternating current (one that keeps reversing direction) to make a fluctuating magnetic field that will, indirectly, produce heat. And that's all that an induction hob does: it generates a constantly changing magnetic field. It does not generate heat directly. You can put your hand on top of it and you won't feel a thing. (Warning: Don't ever put your hand on a cooktop that has recently been used for cooking because it may have become dangerously hot from the cooking pan that's been standing on top of it.) When you stand a suitable cooking pan on top of an induction cooktop that's powered up, the magnetic field produced by the cooktop penetrates the metal of the pan. So we have a fluctuating magnetic field moving around inside a piece of metal (the base and sides of the pan)—and that makes an electric current flow through the pan too (that's all that induction means). Now this is not quite the same as the electric current that flows through a wire, carrying electrical energy in a straight line from (say) a battery to a flashlight bulb. It's a kind of whirling, swirling electric current with lots of energy but nowhere to go; we call it an eddy current. As it swirls around inside the metal's crystalline structure, it dissipates its energy, making heat. Eddy currents are one source of the heat in induction cooking. There's another source of heat too. When you magnetize and demagnetize something, like an iron cooking pan, the process isn't completely reversible: some energy is lost going round the cycle each time. This is caused by something called magnetic hysteresis and it also generates heat. It's a bit like when you stretch and release a rubber band lots of times and it gradually heats up in the process (which is called elastic hysteresis). So the metal pan gets hot and heats up whatever food is inside it, first by conduction (it passes its heat energy directly to the food) but also by convection (liquid food rises and falls in the pan carrying heat with it). Read more about heat transfer in our main article about heat energy. Photo: A typical induction cooktop. Photo by Dennis Schroeder courtesy of US Department of Energy National Renewable Energy Laboratory (NREL), image id # 68829. Photo: Gas burners are easy to control, but waste energy by heating the surrounding air and the cooktop as well as the food in the pan. Since they're naked flames, they're more likely to cause a fire than any electric method of cooking. If you can easily cook with an electric ring or a gas-powered stove, why use an induction cooktop at all? There are quite a few good reasons. Efficiency and speed A traditional cooker generates heat energy some distance from the cooking pot or pan and attempts to transport as much of that energy into the food as possible—with varying degrees of success. If you've ever cooked food on a campfire, you'll know that it's great fun but takes forever. The main reason is that a huge amount of the energy you produce on an open fire is radiated out into the atmosphere; great for ambience, but very slow and inefficient. Even cooking at home can be quite inefficient: you're wasting energy heating the cooktop and (in the case of a stove with a roaring gas flame) the air all around your pots and pans. With induction cooking, the heat is produced in the pan, not the cooktop, and much more of the energy goes into the food. That's why induction cooking is more energy efficient than most other methods (around 85 percent compared to 71 percent for a traditional electric cooktop)—and 70 percent more efficient than cooking with natural gas. [2] Induction cooking also gets energy to the food more quickly, because pans that get hotter faster cook faster. Typically, depending on what you're cooking, it's 25–50 percent faster than other methods, which can be a big plus for restaurants if it helps get dishes to the table more quickly. [3] Convenience, control, and safety Induction cookers are usually built into ceramic or glass cooktops (similar to halogen cooktops), which are very easy to keep clean with just a quick wipe. The magnetic fields they produce make heat appear in the pan almost instantly—and they can make it disappear instantly too. That's very different from traditionally heated pans, which take a while to get hot, so there's a greater risk of burning your food if you don't pay attention! Photo: This model has a touch-sensitive control pad built into the cooktop itself. Each cooking zone is operated by a 0–9 control. There are also low-power, fast-boil, and double controls to expand or reduce the cooking area to suit the pan size. Photo by Dennis Schroeder courtesy of US Department of Energy National Renewable Energy Laboratory (NREL), image id # 68931. You can turn the heat up or down with as much speed and control as a gas cooker (unlike a traditional electric cooktop, which takes some time to heat up or cool down). Even so, it's a different form of cooking and it does take some getting used to: you have to learn which numeric value on the dial corresponds to the amount of heat you need, and that takes practice (to be fair, that applies to any new form of cooking you might try). On the other hand, induction cooktops are easy to switch on or off automatically, so some feature built-in timers, built-in temperature sensors, and even remote control from simple smartphone apps. There's no open flame on an induction cooktop and (until there's a cooking pan actually present) no heat to burn you. Heat appears only when the cooking pan is in place—and the cooktop itself can never get any hotter than the pan sitting on top of it. Electronically controlled cooktops can detect whether pans are standing on them and how much heat they're producing, and most will cut the power out automatically if they're left on by mistake or if a pan starts to boil dry. Induction cookers built into ceramic cooktops are only a couple of inches thick so they can be fitted at any height (good for disabled people in wheelchairs who might want a low-level kitchen). Photo: Ceramic cooktops are strong, durable, and easy to wipe clean in seconds (burned-on food can be gently and carefully removed with a shallow blade). This one is made from a glass-ceramic called Schott CERAN®, widely used in cooktops since it was first introduced in 1971. It's heat resistant (up to at least 700°C or 1300°F), capable of surviving sudden temperature changes, and highly energy efficient (carrying over 80 percent of the heat from the induction coil underneath it to the cooking pan above). Less pollution Combustion-type cooking (natural gas flames or even, in developing countries, open fires) makes significant amounts of indoor air pollution. Gas stoves, for example, generate surprising amounts of nitrogen oxides, gases more commonly associated with diesel engines and outdoor smog. Although electric cooking can still give off "particulates" (unhealthy fine particles) of air pollution, particularly if you're doing things like frying, it's generally cleaner and better for your health. [4] Drawbacks of induction cooktops Until recently, cost was the biggest disadvantage: a typical induction cooktop could be two or three times more expensive than an ordinary electric or gas cooktop and, even though you'd save energy, the energy savings weren't usually significant enough to pay back the difference. The price of induction cooktops has now fallen significantly and there's much less difference in cost compared to ordinary ceramic cooktops. Even so, don't buy an induction cooker with the expectation that you'll see your energy bills fall: cooking represents only a small fraction of the total energy most people use at home and any savings you do make (though welcome and important for the environment) will be modest. [5] Another drawback is that induction cooking only works properly with stainless steel cooking pans containing iron—the only practical, everyday metal that efficiently produces electrical (eddy) currents and has enough resistance to generate heat as they circulate. Copper and aluminum pans also produce eddy currents and conduct electricity very well, but that also means they have much lower resistance, so they don't generate useful heat the same way. Glass doesn't conduct electricity so it doesn't work at all. [6] Iron-based pots and pans compatible with induction cooktops are widely available, so the cookware issue is only really a problem if you have a large collection of existing, unsuitable cookware you're not prepared to replace. Indeed, some people even see it as an opportunity to upgrade. If you are going to replace your cookware, you could investigate "cool-touch" pots and pans made specifically for induction. Some have insulated outer bodies (made from ceramics or heatproof plastics) that stay relatively cool to the touch, with lumps of stainless steel or iron embedded in them to pick up the magnetic field from the cooktop and turn it into heat. Some have built-in temperature sensors that help the cooktop to regulate the power it needs to supply, which also enables automatic, remote control from things like smartphone apps. Artwork: Some induction cookers use smart pans with built-in sensors. Here's an example of how one works. 1) The coil in the cooktop generates a magnetic field. 2) A piece of iron or steel embedded inside the pan picks up the field and converts it into heat. 3) A thermocouple (electrical temperature sensor) directly underneath continually monitors how hot the pan is getting. 4) A separate induction coil inside the pan picks up energy from the cooktop and converts it into just enough electrical power to drive a small radio transmitter. 5) The transmitter sends information from the temperature sensor back to the cooktop (6). The cooktop picks up the radio signal (7) and raises or lowers its power as necessary. Two other minor issues worth noting are that induction cooktops can produce a small amount of noise (from built-in cooling fans) and radio-frequency interference that might pose a risk for people wearing certain types of heart pacemakers. [7] Should you buy an induction cooktop? If you like the speed and control of gas, but prefer the wipe-clean convenience of a ceramic cooktop, and the relatively high initial purchase cost is not an issue, induction cooking might be worth considering. Don't buy to make savings through energy efficiency; you probably won't. Check your existing cookware before you buy; if you have to purchase an entire new set of quality pots and pans, that could add significantly to the outlay of switching to induction cooking. Chris Woodford is the author and editor of dozens of science and technology books for adults and children, including DK's worldwide bestselling Cool Stuff series and Atoms Under the Floorboards, which won the American Institute of Physics Science Writing award in 2016. You can hire him to write books, articles, scripts, corporate copy, and more via his website chriswoodford.com. If you'd rather listen to our articles than read them, please subscribe to our new podcast on Apple Podcasts, Spotify, Audible, Amazon, Podchaser, or your favorite podcast app, or listen below: Find out more On this website Articles about induction cooking If Induction Cooktops Are So Great, Why Does Hardly Anyone Use Them?: The New York Times (Wirecutter), June 25, 2019. An interesting look at why induction cooktops haven't really caught on yet. Hestan Cue: Bringing Intelligent Cookware to Life: Wired, April 2017. Could an induction cooktop you control with an app make mealtimes easier for the masses? Review: Breville PolyScience Control Freak by Joe Ray. Wired, 1 April 2016. How induction can bring greater precision to stove-top cooking. The Freedom Cooktop by Charlie Sorrel. Wired, 9 January 2012. A brief review of one of the latest induction cooktops. Induction Seduction by Matthew Fort. The Guardian, 13 September 2010. A food writer raves about his new induction cooktop. Is Induction Cooking Ready to Go Mainstream? by Kim Severson. The New York Times. April 6, 2010. Explores the pros and cons of induction cooktops and asks whether its adoption by professional chefs will prompt greater mainstream uptake. Induction cooktops: Hot new stoves are cold to the touch by Evan Powell. Popular Science, February 1981. How PopSci revealed early induction cooktops to the world over 30 years ago! Induction Cooktops: Health and safety: Swiss Federal Office of Public Health, 8 November 2011. Are induction cooktops safe? This authoritative review should reassure, although it does point out that there are potential concerns if you have a heart pacemaker or implanted defibrillator. [Archived page served via the Wayback Machine.] Videos Patents For much deeper technical detail, patents are always worth a look. Here's a selection of a few early designs and one very modern, cutting-edge cooktop from Bose: US Patent 3,710,062: Metal base cookware induction heating apparatus having improved power supply and gating control circuit using infra-red temperature sensor and improved induction heating coil arrangement by Philip Peters, Environment/One Corporation, January 9, 1973. and US Patent 3,740,513: Improved consumer oriented combined counter and cooking unit using induction heating by John Matrone and Philip Peters, Environment/One Corporation, June 19, 1973. These early patents show how induction cooktops were always conceived as safer, cleaner, and more convenient alternatives to traditional stoves. US Patent: 3,742,173: Method and equipment for cooking electronically by specifying watts setting by William Kornrumpf and John Harnden, General Electric, June 26, 1973 and US Patent: 3,742,179: Induction cooking appliance including wireless transmission of temperature data by John Harnden, General Electric, June 26, 1973. These are two of the original patents covering modern-style induction cooking US Patent: 9,006,622: Induction cooking by David Beverley et al, Bose Corporation, April 14, 2015. A more modern cooktop with built-in temperature sensors. Books More general books about electromagnetism For older readers For younger readers Electricity by Chris Woodford. Rosen. 2013 (issued previously by Blackbirch, 2004). One of my own books, this volume explains how scientists have figured out the mysteries of electricity and magnetism, from ancient times to the present day. Ages 9–12. ↑ For more on why cooking was such a radical step forward for humankind, see Richard Wrangham's Catching Fire: How Cooking Made us Human. New York, Basic Books: 2010. ↑ The figure of 85 percent comes from 2021-2022 Residential Induction Cooking Tops from EnergyStar.gov. My comparisons with conventional electric cooking and gas are from [PDF] A Tool to Prioritize Energy Efficiency Investments by Philip Farese et al, NREL Technical Report NREL/TP-6A20-54799, August 2012, p.104. ↑ The figure of 50 percent comes from Chapter 7: Household Air Pollution from Solid Cookfuels and Its Effects on Health of Injury Prevention and Environmental Health (3rd edition) by C. Mock et al (eds), World Bank, 2017. Most sources seem to suggest a lower figure closer to 25 percent. ↑ For more, see Ultrafine particles and nitrogen oxides generated by gas and electric cooking by M. Dennekamp et al, 2001. And, if this surprises you, it's even more surprising that it's pretty old news! Air pollution epidemiologists, such as the famous Harvard "Six Cities" team, have been reporting on the health harms of gas cooking since at least the 1980s. See for example Respiratory disease rates and pulmonary function in children associated with NO_2 exposure (Frank Speizer et al, 1980) and Passive smoking, gas cooking, and respiratory health of children living in six cities (J H Ware et al, 1984). ↑ Compared to space heating, air conditioning, and refrigeration, cooking represents such a minor part of home energy use that it's not even separately detailed in the US Department of Energy's Residential Energy Consumption surveys. For homes reliant on natural gas, detailed energy use consumption charts suggest cooking uses about 4 percent as much energy as space heating. ↑ I've simplified this discussion of different metals somewhat. There's also the skin effect to take into consideration, but explaining that is a bit beyond what most readers will want or need to know. ↑ See for example Do induction cooktops interfere with cardiac pacemakers? by Werner Irnich and Alan D Bernstein.