Digital Tampering in the Media, Politics and Law
(http://www.cs.dartmouth.edu/farid/research/digitaltampering/)

Photography, of course, lost its innocence many years ago. In as early as the 1920s, shortly after the first commercially available camera was introduced, Stalin had his enemies "air-brushed" out of photographs. With the advent of high-resolution digital cameras, powerful personal computers and sophisticated photo-editing software, the manipulation of digital images is becoming more common. Here, I have collected some examples of digital tampering in the media, politics, and the law. To help contend with the implications of this tampering, we have developed a series of tools for detecting traces of tampering in digital images.

circa 1860: This nearly iconic portrait of U.S. President Abraham Lincoln is a composite of Lincoln's head and the Southern politician John Calhoun's body. Putting the date of this photograph into context, note that the first permanent photographic image was created in 1826 and the Eastman Dry Plate Company (later to become Eastman Kodak) was created in 1881.

February 1982: In this National Geographic magazine cover story on Egypt, the Great Pyramids of Giza, in a horizontal picture by Gordon Gahen, were "squeezed" together to fit the magazine's vertical format. Tom Kennedy, who became the director of photography at National Geographic after the cover was manipulated, stated that "We no longer use that technology to manipulate elements in a photo simply to achieve a more compelling graphic effect. We regarded that afterwards as a mistake, and we wouldn't repeat that mistake today". 
**August 1989:** The cover of TV Guide displayed this picture of daytime talk-show host Oprah Winfrey. This picture was created by splicing the head of Winfrey onto the body of actress Ann-Margret, taken from a 1979 publicity shot. The composite was created without permission of Winfrey or Ann-Margret, and was detected by Ann-Margret's fashion designer, who recognized the dress.

![Oprah TV Guide Cover](image)

**July 1992:** This cover of Texas Monthly shows the then Texas Governor Ann Richards astride a Harley-Davidson Motorcycle. This picture was created by splicing the head of Richards onto the body of a model. The editors explained that their credit page disclosed this fact by noting in the credits page "Cover Photograph by Jim Myers ... Stock photograph (head shot) By Kevin Vandivier / Texastock". After the motorcycle cover appeared, Richards said that since the model had such a nice body, she could hardly complain.

![Texas Monthly Cover](image)
February 1994: This digital composite of Olympic ice skaters Tanya Harding and Nancy Kerrigan appeared on the cover of New York Newsday. The picture showed the rivals practicing together, shortly after an attack on Kerrigan by an associate of Harding's husband. The picture caption reads: "Tonya Harding, left, and Nancy Kerrigan, appear to skate together in this New York Newsday composite illustration. Tomorrow, they'll really take to the ice together."

June 1994: This digitally altered photograph of OJ Simpson appeared on the cover of Time magazine shortly after Simpson's arrest for murder. This photograph was manipulated from the original mug-shot that appeared, unaltered, on the cover of Newsweek. Time magazine was subsequently accused of manipulating the photograph to make Simpson appear "darker" and "menacing".
December 1997: This digitally altered photograph of Kenny and Bobbi McCaughey appeared on the cover of Newsweek magazine shortly after Bobbi gave birth to septuplets. This photograph was manipulated from the original that appeared, unaltered, on the cover of Time magazine. Newsweek manipulated the photograph to make Bobbi's teeth straighter, and were accused of trying to make her "more attractive".

December 2000: The CBS emblem in this single frame of a live video broadcast, was digitally inserted during the new year's eve broadcast so as to conceal the NBC emblem that was on display in the background. The technology used in this case, is the same as that widely employed during the broadcast of sporting events to display advertisements on billboards.

September 2000: Hoping to illustrate its diverse enrollment, the University of Wisconsin at Madison doctored a photograph on a brochure cover by digitally inserting a black student in a crowd of white football fans. The original photograph of white fans was taken in 1993. The additional black student, senior Diallo Shabazz, was taken in 1994. University officials said that they spent the summer looking for pictures that would show the school's diversity -- but had no luck.
April 2002: The 1996 Child Pornography Prevention Act (CPPA) extended the existing federal criminal laws against child pornography to include certain types of "virtual porn". In 2002, hearing Ashcroft v. Free Speech Coalition, the United States Supreme Court found that portions of the CPPA, being overly broad and restrictive, violated First Amendment rights. The Court ruled that images containing an actual minor or portions of a minor are not protected, while computer-generated images depicting a fictitious "computer-generated" minor are constitutionally protected.

April 2003: This digital composite of a British soldier in Basra, gesturing to Iraqi civilians urging them to seek cover, appeared on the front page of the Los Angeles Times shortly after the U.S. led invasion of Iraq. Brian Walski, a staff photographer for the Los Angeles Times and a 30-year veteran of the news business, was fired after his editors discovered that he had combined two of his photographs (1, 2) to "improve" the composition.

February 2004: This digital composite of Senator John Kerry and Jane Fonda sharing a stage at an anti-war rally emerged during the 2004 Presidential primaries as Senator Kerry was campaigning for the Democratic nomination. The picture of Senator Kerry was captured by photographer Ken Light as Kerry was preparing to give a speech at the Register for Peace Rally held in Mineola, New York, in June 1971. The picture of Jane Fonda was captured by Owen Franken as Fonda was speaking at a political rally in Miami Beach, Florida, in August 1972.
March 2004: This political ad for George W. Bush, as he was running for President, shows a sea of soldiers as a backdrop to a child holding a flag. This image was digitally doctored by copying and pasting, from this original photograph, several soldiers to digitally remove Bush from a podium. After acknowledging that the photo had been doctored, the Bush campaign said that the ad would be re-edited and re-shipped to TV stations.

![Image of political ad](image1.jpg)

April 2004: This image, which was widely circulated on the internet, shows a U.S. Marine posing for a photo with two Iraqi children while holding a sign reading "Lcpl Boudreau killed my Dad then he knocked up my sister". Boudreau claims that this image was tampered with from the original, in which the sign read "Welcome Marines". A military investigation into potential wrong-doing was inconclusive. It remains unclear if this image is authentic.

![Image of U.S. Marine and Iraqi children](image2.jpg)

March 2005: This digital composite of Martha Stewart's head on a model's body appeared on the cover of Newsweek as Stewart was emerging from prison "thinner, wealthier and ready for prime time", as the headline reads. Newsweek disclosed the source of the cover image on Page 3 with the lines: "Cover: Photo illustration by Michael Elins ... head shot by Marc Bryan-Brown."

![Image of Martha Stewart on the cover of Newsweek](image3.jpg)
March 2005: This Harper's cover, taken at Parris Island, S.C., shows seven Marines lined up in their T-shirts, shorts and socks. The picture accompanied a story about soldiers that go AWOL (absent without leave). The soldiers depicted in the picture, however, were not AWOL. The picture was supplied by Getty Images as a stock photograph. "We are decorating pages," said Giulia Melucci, the magazine's vice president for public relations. "We are not saying the soldiers are AWOL. Our covers are not necessarily representative."

April 2005: An article in the journal Nature reports on the impact of digital photography and image-manipulation software in science. For example, Mike Rossner, editor of the Journal of Cell Biology, estimates that roughly 20% of accepted manuscripts to his journal contain at least one figure that has to be remade because of inappropriate image manipulation. And, in 1990, 2.5% of allegations examined by the U.S. Office of Research Integrity, which monitors scientific misconduct, involved contested scientific images. By 2001, this figure was nearly 26%.

April 2005: In this doctored photograph, British politicians Ed Matts, conservative candidate for Dorset South, and Ann Widdecombe, conservative candidate for Maidstone and the Weald, are shown holding a pair of signs that together read "controlled immigration -- not chaos and inhumanity". This picture appeared as part of Matts' election literature. The original photograph, however, shows the same two candidates campaigning for a Malawian family of asylum seekers to be allowed to stay in Britain. Widdecombe said she was "happy to be associated with either message".
April 2005: This digital composite of actors Brad Pitt and Angelina Jolie, rumored to have a romantic relationship, appeared on the cover of Star Magazine. The picture of Pitt was taken in Anguilla, a Caribbean island, in January 2005. The picture of Jolie was taken in Virginia some time in 2004. On page 8 is a disclaimer noting the image is a "composite of two photographs." This composite was purchased from Big Pictures, a London-based photography agency, for $500,000.

June 2005: This picture from the Harvard College viewbook features a doctored version of the Harvard's newspaper March 9, 2005 front page. The headline in the original front page, reading "Summers To Face No Confidence Vote", was replaced with an illegible block of text. A Harvard spokesman confirmed that someone involved with the production of the viewbook had decided to remove the headline -- "It's a mistake, and it should not have happened", he said.

July 2005: This digital composite appeared on a campaign flyer for New York City Democratic mayoral candidate Virginia Fields. The picture shows Fields standing with a diverse group of people. Fields' chief campaign consultant, Joe Mercurio, admitted the picture was a composite of four separate photos. The picture, according to Mercurio, was meant to show that she has broad support and was not intended to deceive anyone.
August 2005: Florida Congresswoman Katherine Harris, who is running for a U.S. Senate seat next year, has accused some newspapers of doctoring photos to distort her makeup as a way to poke fun at her. Harris became famous when she oversaw the Florida recount in the 2000 presidential election, that gave George W. Bush a 537-vote victory in Florida. "I'm actually very sensitive about those things, and it's personally painful," she said. "But they're outrageously false.... Whenever they made fun of my makeup, it was because the newspapers colorized my photograph." Harris and her staff have not, however, been able to cite a specific example of an altered photo. The photo of Harris, shown here, is not known to have been doctored.

![Image of Katherine Harris](image1.png)

August 2005: A magistrate in Sydney, Australia threw out a speeding case after the police said it had no evidence that an image from an automatic speed camera had not been doctored. This case revolved around the integrity of MD5, a digital signature algorithm, intended to prove that pictures have not been doctored after their recording. It is believed that this ruling may allow any driver caught by a speed camera to mount the same defense.

September 2005: This photo, taken of U.S. President George W. Bush as he sat in a meeting of the United Nations Security Council, shows Bush scribbling a note to Secretary of State Condoleezza Rice reading, "I think I may need a bathroom break. Is this possible?" Reuters' picture editor, Gary Hershorn, explained that sections of the photo were overexposed so a Reuters' processor used the Photoshop technique to "burn down the note." Hershorn says that the photo was not manipulated in any way, but that it was standard practice for such news photos to be enhanced.

![Image of Bush's note](image2.png)
October 2005: In August of 2005, the actor Tom Sizemore was convicted on charges of domestic violence, criminal threats, vandalism, and making obscene and harassing phone calls. In appealing this decision, Sizemore's lawyers contend that pictures showing the victim, Heidi Fleiss, with injuries, were faked. Los Angeles Superior Court Judge Antonio Barreto Jr. has given prosecutors 30 days to prove the photos were not doctored, or produce the person who took the photographs.

October 2005: This doctored photo of Secretary of State Condoleezza Rice appeared alongside a USA Today news story about Rice's comments to U.S. Lawmakers regarding U.S. Troops in Iraq. After receiving complaints from readers, this photograph was removed from USA Today's website, and the following Editor's note appeared alongside a "properly adjusted copy": Photos published online are routinely cropped for size and adjusted for brightness and sharpness to optimize their appearance. In this case, after sharpening the photo for clarity, the editor brightened a portion of Rice's face, giving her eyes an unnatural appearance. This resulted in a distortion of the original not in keeping with our editorial standards.

November 2005: This digitally altered image of illustrator Clement Hurd appeared in a newly revised edition of the book "Goodnight Moon", a classic children's book written by Margaret Wise Brown and illustrated by Hurd. The publisher, HarperCollins, altered the original photograph to remove a cigarette from Hurd's hand. HarperCollins said it made the change to avoid the appearance of encouraging smoking and did so with the permission of the illustrator's estate. But Mr. Hurd's son said he felt pressured to allow it. Prior to this latest edition, the photograph of Mr. Hurd grasping a cigarette has been on the book for at least two decades.
**December 2005:** A political video produced by the Republican National Committee (RNC) depicts a U.S. soldier watching a television where Democratic leaders are speaking critically of the Bush administration's handling of the war in Iraq. The final screen shot, shown to the right, reads "Our soldiers are watching and our enemies are too." As shown in this original frame, this video was digitally altered -- the soldier was watching the movie How the Grinch Stole Christmas.

**January 2006:** In 2004, Professor Hwang Woo-Suk and colleagues published what appeared to be ground-breaking advances in stem cell research. This paper appeared in one of the most prestigious scientific journals, Science. Evidence slowly emerged that these results were manipulated and/or fabricated. After months of controversy, Hwang retracted the Science paper and resigned his position at the University. An independent Korean panel investigating the accusations of fraud found, in part, that at least nine of the eleven customized stem cell colonies that Hwang had claimed to have made were fakes. Much of the evidence for those nine colonies, the panel said, involved doctored photographs of two other, authentic, colonies.

**January 2006:** In 2001, Dr. Jon Sudbo of the Norwegian Radium Hospital in Oslo published a study, in the prestigious journal Lancet, contending that long-term use of certain non-steroidal anti-inflammatory drugs reduced the risk of oral cancer. This finding was touted as a way to shift the focus of treatment away from surgery and toward new drug therapies. These results were cast into doubt when it was revealed that 250 of Sudbo's sample of 908 people in that study all shared the same birthday. In addition, it was revealed that two photographs from a microscope, reportedly representing two different patients at different stages of precancerous mouth lesions, were different magnifications of the same image. The editors of Lancet issued an "expression of concern" saying Sudbo's research was "just complete fabrication."

**January 2006:** Famed Indian movie star Khushboo is taking legal action against the publishers of Maxim magazine for the publication of a doctored photograph. The photograph was created by digitally splicing Khushboo's head onto another model's scantily clad body. This photograph was published in the Indian version of Maxim under the heading "Women you will never see in Maxim - 100% fake". Magazine editor, Sunil Mehra, said "We are deeply apologetic for causing any inadvertent hurt and offence to Khushboo. Despite an apology, Khushboo plans to go to court, "Indeed the punishment that is finally meted out to them should be a deterrent against anyone who tries to treat women as a commodity and exploit them as they please. I will not opt for any kind of out-of-court settlement," she said.
March 2006: This cover of the San Antonio Observer features a San Antonio police officer wearing a white hood of the Ku Klux Klan. The newspaper admits that they digitally inserted the hood and gun into the original photograph. Police spokesman Joe Rios said that the Observer defamed the character of the officer in the photograph. "You can clearly read his badge number," Rios said. "I can tell you that the officer who was depicted in that picture is very upset." Ida Brown, an Observer spokeswoman, disputed that the officer's badge number could be discerned on the cover and said the image was not intended as a personal attack. "Primarily, the picture shows that there are racist police officers on the force, and they do target minorities who are innocent," Brown said.

March 2006: This March 12th cover of the New York Times Magazine shows former Virginia Governor Mark Warner, a possible contender in the 2008 U.S. presidential race. After receiving complaints from Warner's campaign about the accuracy of this photo, the New York Times published the following correction. "The cover photograph in The Times Magazine on Sunday rendered colors incorrectly for the jacket, shirt and tie worn by Mark Warner, the former Virginia governor who is a possible candidate for the presidency. The jacket was charcoal, not maroon; the shirt was light blue, not pink; the tie was dark blue with stripes, not maroon. The Times's policy rules out alteration of photographs that depict actual news scenes and, even in a contrived illustration, requires acknowledgment in a credit. In this case, the film that was used can cause colors to shift, and the processing altered them further; the change escaped notice because of a misunderstanding by the editors."
June 2006: This photograph, showing two police officers standing by as prostitutes in Cuba hail a foreign tourist, appeared in the El Nuevo Herald under the headline "Hookers: The Sad Meat of the American Dollar". This image, however, was a composite of two separate photographs taken by veteran photographer Roberto Koltun, and published over his objections. "Two things were put together," commented photo coordinator Orlando Mellado. "Asked why the photograph was published, Mellado responded "that's a decision that was made by another editor."

July 2006: This controversial ad appeared as part of the Ohio Senate campaign between incumbent Mike DeWine (R) and challenger Sherrod Brown (D). DeWine's campaign created a video of the World Trade Center in flames to attack Brown as soft on terrorism. The ad shows the south tower burning -- the north tower was hit first, however, so the south tower could not be burning without the north tower burning as well. A DeWine spokesman acknowledged the image was a "graphic representation" by the firm that produced the ad, which used a still photo of the towers with computer-generated smoke added.
July 2006: The Charlotte Observer fired Patrick Schneider, a staff photographer, for altering this image of a fire fighter. Following the incident, the paper released the following statement: "Photographer Patrick Schneider's photo depicted a Charlotte firefighter on a ladder, silhouetted by the light of the early morning sun. In the original photo, the sky in the photo was brownish-gray. Enhanced with photo-editing software, the sky became a deep red and the sun took on a more distinct halo. The Observer's photo policy states: No colors will be altered from the original scene photographed." Schneider said that he only meant to restore the actual color of the sky that was lost when he underexposed the photo. Schneider was suspended in an earlier episode after it was revealed that his award-winning photographs had been manipulated. Scheider allowed this case to be used to educate other professional photographers in ethics seminars. At the time he pledged, "I will no longer tone my background down that far."

![Image of a firefighter on a ladder, silhouetted by the light of the early morning sun.](image)

August 2006: This photograph by Adnan Hajj, a Lebanese photographer, showed thick black smoke rising above buildings in the Lebanese capital after an Israeli air raid. The Reuters news agency initially published this photograph on their web site and then withdrew it when it became evident that the original image had been manipulated to show more and darker smoke. "Hajj has denied deliberately attempting to manipulate the image, saying that he was trying to remove dust marks and that he made mistakes due to the bad lighting conditions he was working under", said Moira Whittle, the head of public relations for Reuters. "This represents a serious breach of Reuters' standards and we shall not be accepting or using pictures taken by him." A second photograph by Hajj was also determined to have been doctored.

![Image of thick black smoke rising above buildings in the Lebanese capital after an Israeli air raid.](image)
August 2006: An Easton, Middlesbrough (UK) man, Stafford Sven Tudor-Miles, scanned photographs of adult porn stars into his computer and digitally altered them so that the women appeared to be of girls under the age of 18. The 38-year-old fine art student was charged with possessing indecent pseudo-images of children. His barrister argued that the pictures were of adults and, therefore, no offense had been committed. Under the Protection of Children Act 1978, as amended by the Criminal Justice and Public Order Act 1994, a pseudophotograph of a child is defined as an image, whether made by computer graphics or otherwise, which appears to be that of a child. Possession or creation of such an image is, therefore, illegal. Tudor-Miles pleaded guilty to five counts of attempting to make indecent pseudo-photographs of children, one charge of possessing indecent pseudo-photographs and one of breaching a sex offenders order. Tudor-Miles will be sentenced on September 8.

August 2006: Nathan Noy, a rival of Rep. Jean Schmidt (R-Ohio), contends that this picture on Schmidt's webpage showing her at a 1993 Marathon has been doctored. The photo shows Schmidt near the finish line with the time clock showing 3:19:06. But a newspaper list does not include Schmidt's name. Joseph Braun, an attorney representing Schmidt, denied that the photograph is fake. He produced what he said was an official race results book, listing Schmidt as the fifth-place finisher in her age group with a time of 3:19:09. A four-member commission panel ruled that there was enough evidence to look into the complaint.

September 2006: A photograph of CBS news anchor Katie Couric was digitally altered from this original to give Couric a trimmer waistline and a thinner face. This photo appeared in CBS' in-house magazine Watch! CBS spokesman, Gil Schwartz, said the doctored image was the work of a CBS photo department employee who got a little zealous. Schwartz added, "I talked to my photo department; we had a discussion about it; I think photo understands this is not something we'd do in the future."