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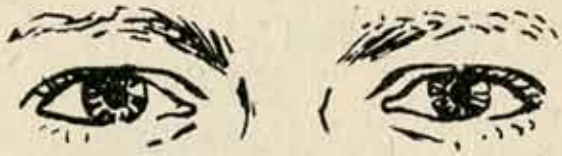

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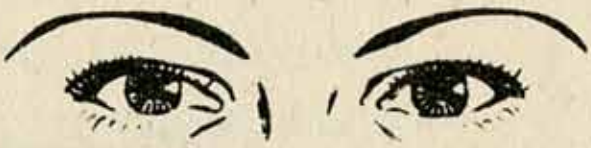

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FACIAL RECOGNITION

THE WENDE MUSEUM

December 12, 2015 - March 18, 2016

Introduction

One of the paradoxes of life today is that we are forced to decide how much personal freedom to surrender in order to strengthen our sense of safety. Does the threat of terrorist attacks justify a strict system of surveillance? Can this system be turned against us in the form of political control or personalized advertising? Are we willing to give up our privacy, and are we even aware of it?

This exhibition showcases The Wende Museum's unique collection of facial recognition training materials from East German border guards stationed at the eastern side of Checkpoint Charlie, the former border crossing between East and West Berlin. Materials from the history of facial analysis and interpretation since the late eighteenth century, and present-day political, commercial and artistic applications of facial recognition technologies contextualize this collection. The exhibition touches on theories that propose a direct relation between outward appearance and inner character (Lavater), the link between facial characteristics and criminal behavior (Lombroso), the classification of a facial typology (Galton), the objective approach to personal facial identification (Bertillon), and the recognition of emotions through the analysis of facial expressions (Ekman). Moreover, there are displays of materials from present-day companies specializing in digitized facial recognition technology as well as art projects by internationally acclaimed artists Zach Blas, Nancy Burson, Kathleen McDermott, and Leo Selvaggio, whose works critically engage with issues of identity, privacy, and control in our information age.

Visitor interacting with Leo Selvaggio's *URME Surveillance* at the *Facial Recognition* opening reception on December 12, 2016

Checkpoint Charlie Borderguard Collection

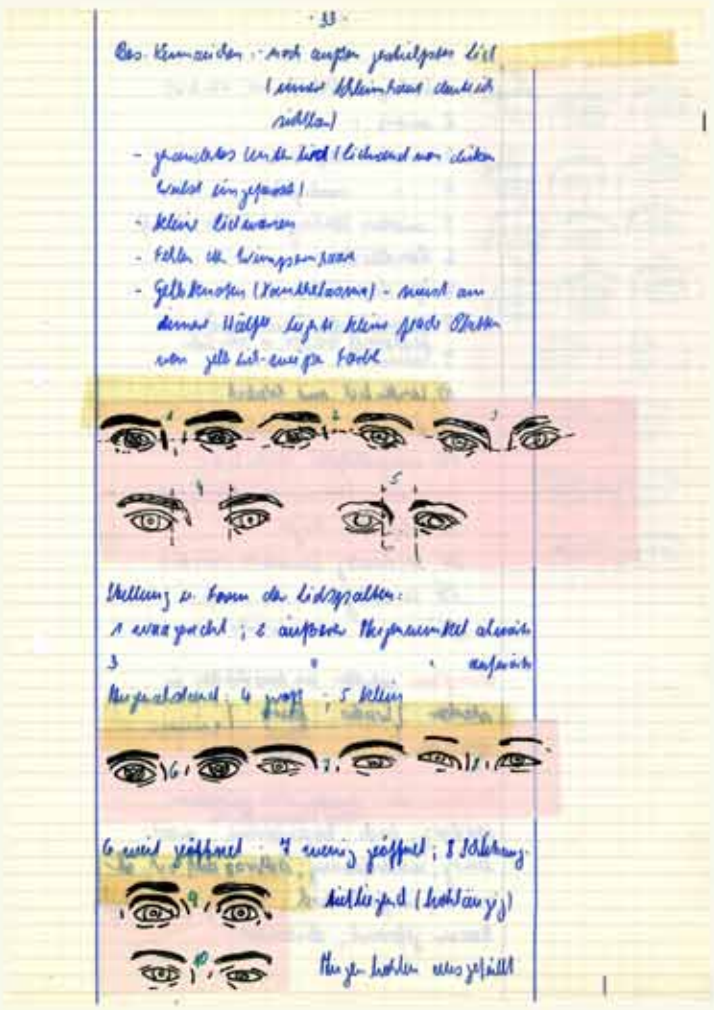
The head of the passport division of the border guards at the Friedrichstrasse – Zimmerstrasse border crossing, the east side of "Checkpoint Charlie," from 1975 to 1990 was originaly trained as a bricklayer. He supervised an elaborate system of facial recognition. The drawings and sketches used at the checkpoint offer fascinating insights. The aim was to develop a scientific method of personal identification that would be universally applicable.

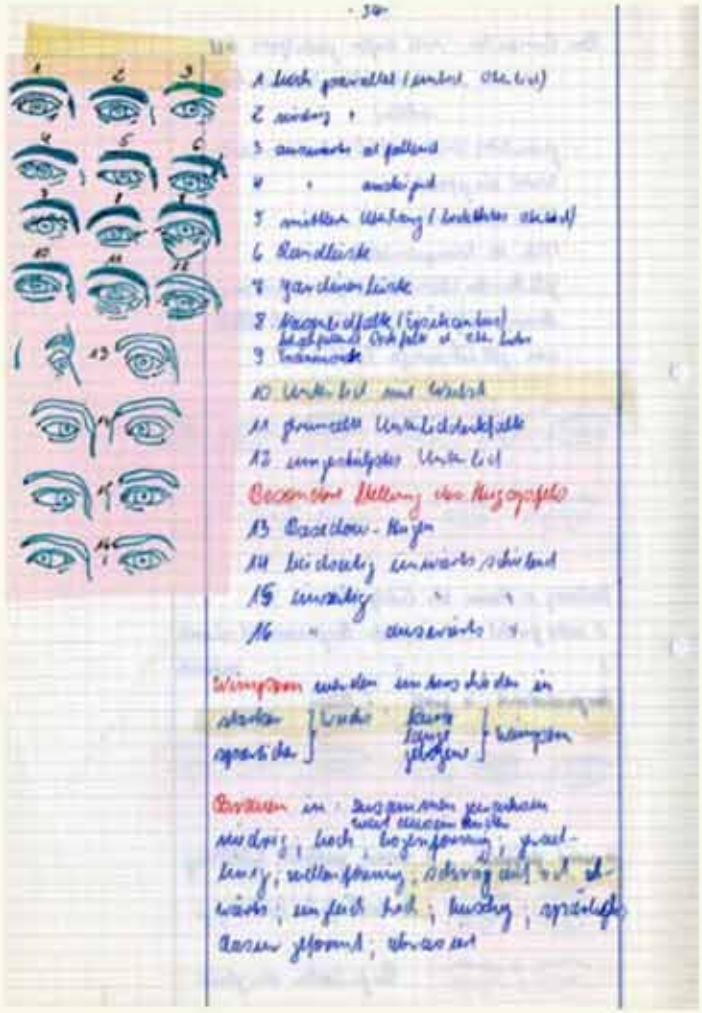
The officer started his research on facial recognition at the University of Law in Potsdam, which fell under the Ministry of State Security or "Stasi." To train the border guards under his command, he used flash cards, showing pairs of portrait photographs of the same person or look-alikes. Starting in 1988, he arranged an exhibition space at the border, which was inaugurated in time for the 40th anniversary of the GDR, on October 7, 1989. His method was used to train border guards after the fall of the Berlin Wall.

He remained employed at the checkpoint until August 31, 1990, even though the border lost its economic relevance after the monetary union of the GDR and the Federal Republic on June 30, 1990. Although he disagreed with certain aspects of its system, especially during the final years of the state, he always remained loyal to East Germany. In reunited Germany, he tried to interest other parties (border guards, police, banks) in his methodology, but in a time of digitized and computerized systems of facial recognition, his method was no longer deemed relevant.

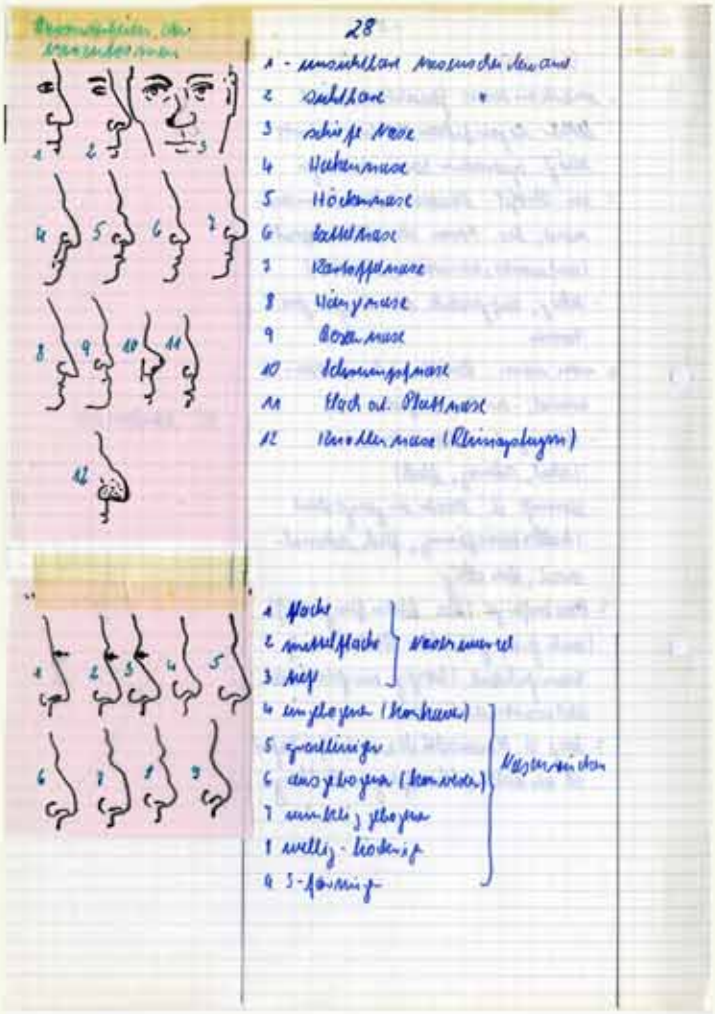
In 2004 the Wende Museum acquired his papers, along with other unique materials from the border crossing.

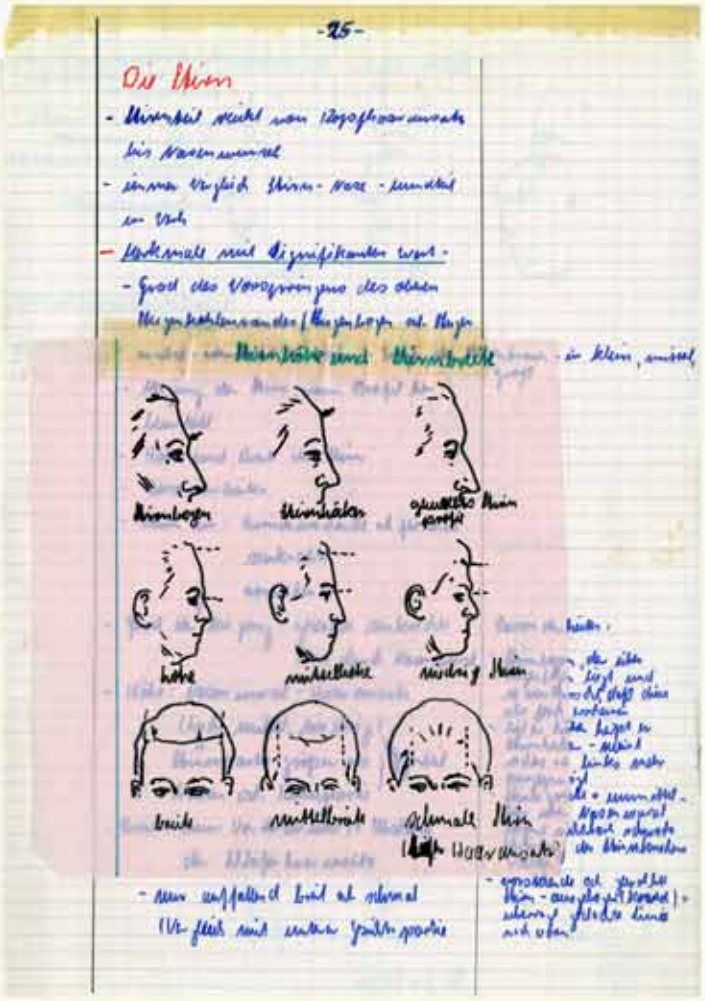
Exerpts from video interview with former East German Border Guard recorded in Berlin, May 18th, 2006. Interviewer: John Ahouse



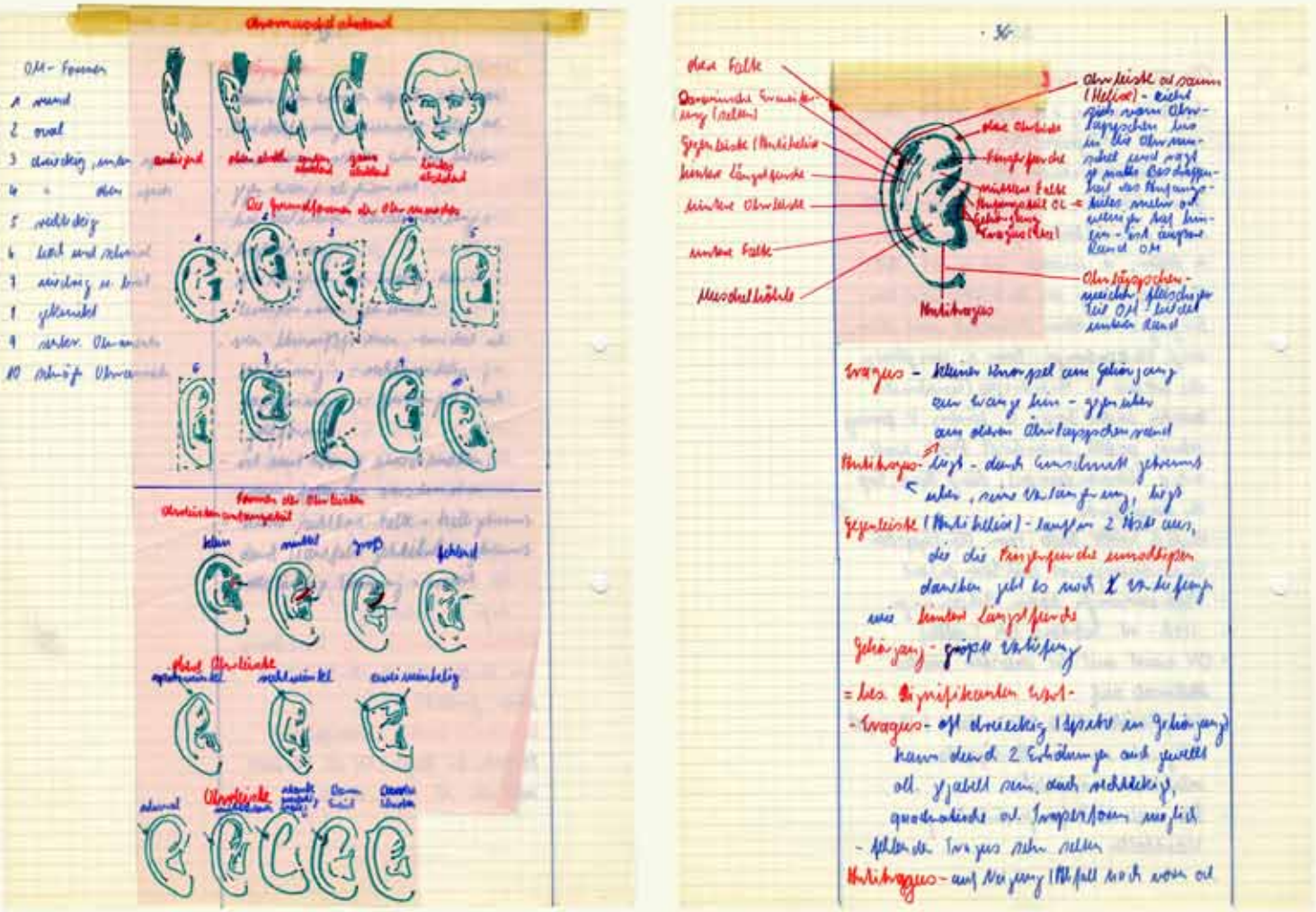


East German border guard training materials, 1970s

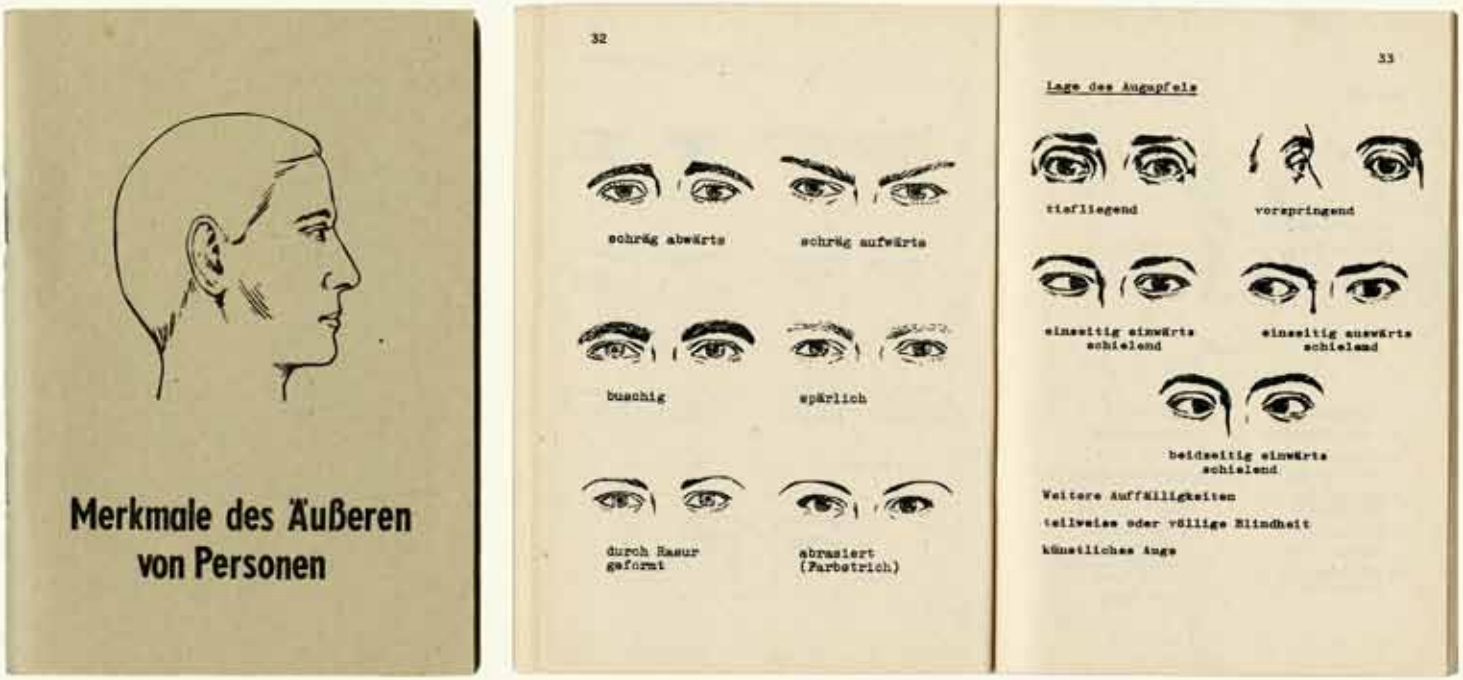




East German border guard training materials, 1970s



East German border guard training materials, 1970s



Pages from *Merkmale des Äußeren von Personen (People's Physical Characteristics)*, 1970, published by the Ministry of State Security (Stasi), Hauptabteilung VI

Passport History

Written documents to allow individuals travel beyond their own city originated in the Middle Ages in the Mongol Empire, the Islamic world, and in Europe. The word "passport" originated in the mid-16th century and seems to derive from passing a maritime port, because most international travel at this time was by ship. Around 1800, almost all European countries issued passports for their citizens and required visas for foreign visitors. However, by the middle of the nineteenth century, the use of travel documents became more or less obsolete in Europe due to the rapid expansion of train travel and the vastly growing number of people crossing borders.

In 1861, France officially abolished the passport and visa system. Looking back in his memoir *Die Welt von Gestern* (*The World of Yesterday*, 1942), Austrian writer Stefan Zweig vividly describes a Europe without travel limitations and a free exchange of people, goods and ideas. This freedom of movement would radically change with the outbreak of the First World War.

In late 1914, European countries started to issue passports with photographs, a personal signature and a physical description including categories like facial shape, complexion, and special features. In the course of the twentieth century, there were several attempts to standardize passport formats internationally, in part instigated by the League of Nations (1920-1946) and subsequently the United Nations.

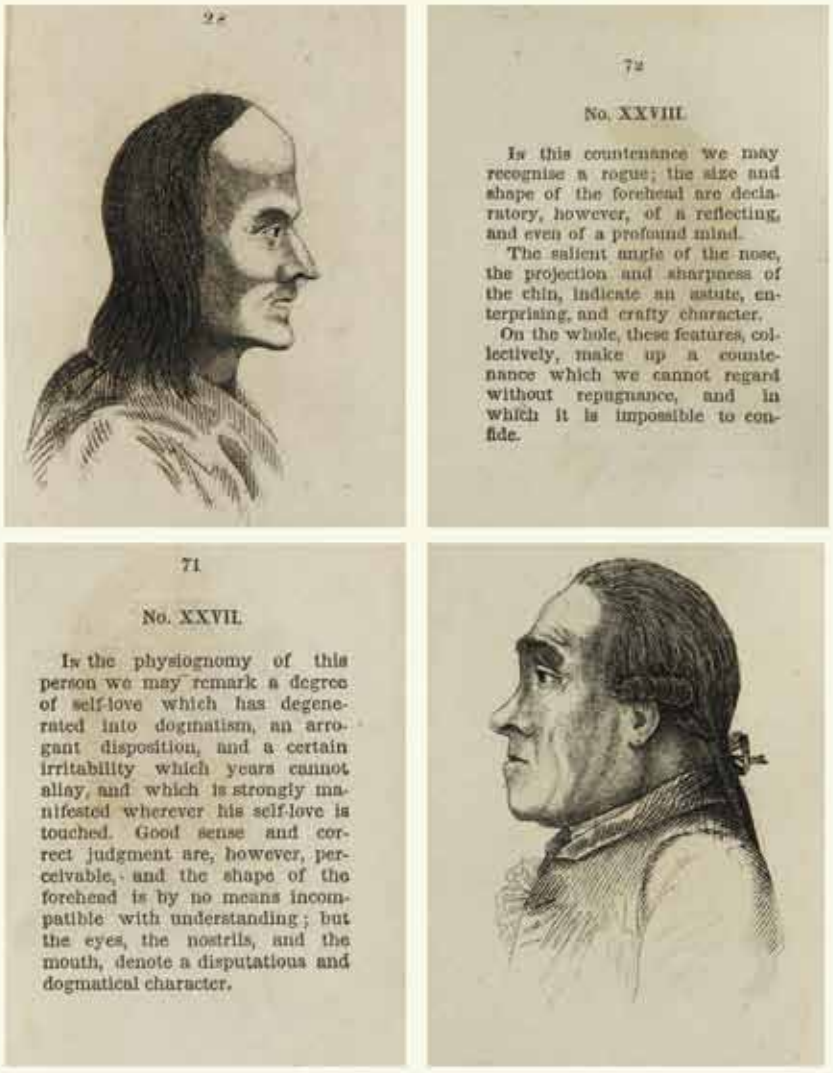
In 1980, under the auspices of the International Civil Aviation Organization, machine-readable passports became the international norm. Currently, passports containing a computer chip with biometric information such as fingerprints and iris scans are being introduced in a growing number of countries.

International passports confiscated by East German border guards

Johann Caspar Lavater (1741-1801)

In his *Natural History*, the Roman author Pliny the Elder recounts the story of the origin of the visual arts. The daughter of Butades, a Greek potter from Sycion near Corinth, copied the outline of the shadow of her lover's face, resulting in the first silhouette image. Silhouettes are also at the foundation of facial recognition technology.

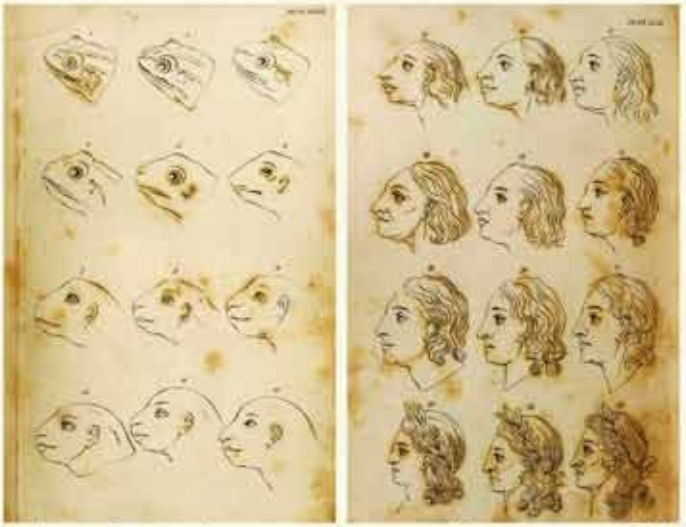
Between 1775 and 1778, the Swiss pastor, mystic, philosopher, and physiognomer Johann Caspar Lavater (1741-1801) published his *Physiognomische Fragmente zur Beförderung der Menschenkenntnis und Menschenliebe* (*Physiognomic Fragments for the Advancement of Human Knowledge and Human Love*). In four volumes, Lavater develops the theory that outward appearance expresses inner qualities such as national character and morality.



Johann Caspar Lavater, *The Pocket Lavater*, or, *The Science of Physiognomy*, 1817
Human faces and their character traits.

The idea of a relationship between someone's face and his character is at least as old as Plato, and the Italian Renaissance scientist and playwright Giambattista della Porta claimed that what looks alike must essentially be alike, so that for instance a man who looks like a sheep must have the character of a sheep. But it was Lavater who first developed a (pseudo)scientific method to investigate these correspondences by categorically analyzing different parts of the face. His book was widely admired and quickly translated into several languages. The English version, *Essays on Physiognomy*, appeared between 1789 and 1798.

Johann Caspar Lavater, *The Pocket Lavater*, 1817. Human faces and corresponding animals.



Johann Caspar Lavater, *Essays on Physiognomy*, 1853 [1789-1798]. Evolution from frog to human face.

Lavater collected an image archive of silhouettes from famous persons, writers, aristocrats, citizens, the poor, criminals, and other categories to provide evidence for his work. Faces were to him like the letters of a divine alphabet that could be "read" and understood through proper study. Among the many contemporaries who discussed Lavater's theory with him were Johann Wolfgang von Goethe, Johann Gottfried von Herder, and the Swiss artist Henry Füseli (Johann Heinrich Füssli), who illustrated Lavater's work.

Johann Caspar Lavater, *Essays on Physiognomy*, 1853 [1789-1798]. Drawings and silhouette images.

"In this face we may search in vain for a single expression of frankness: this slightly-projecting chin, when accompanied with small penetrating eyes, denotes the absence of sincerity. There is no display of benevolence in this oblique mouth; and avarice reveals itself in these close locked lips. Combine all these features, and they result in a cunning, deceitful, avaricious, and not merely firm, but stubborn, old fellow. Such a man moves quick, and speaks slowly and circumspectly; for suspicion is the mainspring of his character."

"Here are indelibly depicted a dull and narrow intellect, self-conceit, and the grossest ignorance. We may observe that a nose of this form, in connexion with thick lips, is always a prognostic of obstinacy; still more if the forehead be also perpendicular; and, above all, if the occiput, instead of being arched, is concave. And here we may apply this general rule, that every remarkable concavity denotes a defect in the corresponding organ."

"This countenance has been disfigured by intemperance, as is apparent from every feature; nature never formed a nose like this; these lips, these wrinkles, are all expressive of insatiable thirst; the glance of the eye has lost its native energy. The nose and cheeks of a person addicted to intoxication are almost always red, and the edges of the eyelids are often tinged with the same colour; in general, the skin, especially under the chin, is flaccid and wrinkled."

Johann Caspar Lavater, *The Pocket Lavater*, 1817
Human faces and their character traits.

Francis Galton (1822-1911)

A cousin of Charles Darwin, Francis Galton was a versatile scientist who wrote about statistics, anthropology, psychology, eugenics, and many other subjects. Galton systematized the classification of fingerprints so that it became a relatively simple and reliable means of personal identification, which gradually replaced Bertillon's system of facial recognition in criminal anthropology and in courts of justice. But Galton also theorized about the outward appearance of faces and their potential correspondence to inward qualities. As a statistician, he worked according to a scientific method, collecting large quantities of data and comparing the results.

Francis Galton, Composite portraits of American scientific men, reproduced in *Science* (May 8, 1885), University College, London

Henry Pickering Bowditch, *Twelve Boston Physicians and Their Composite Portrait*, 1892, Francis A. Countway Library of Medicine, Harvard University, Boston. Galton admired Bowditch's work.

Starting in the 1880s, Galton developed his concept of composite portraiture: the idea that an ideal type could be identified by superimposing several images. For instance, by combining a large number of photographs from criminals, the ultimate "criminal face" could be determined, or, for that matter, the typical Jew or the typical sufferer from tuberculosis.

Galton described four different uses for his composite portraits: to give us a clear perception of the differences of human races; to replace unique images of an individual, which are always subject to momentary moods, by a generalized, essential image; to give a more reliable idea of what historical personalities might have looked like by combining all existing, often quite dissimilar renderings of these persons; and to predict how potential children might look, based on the facial characteristics not only of their future parents but also of their respective families. Galton was in favor of using this information for eugenic measures to encourage "better" people to produce offspring while discouraging others.

Francis Galton, Illustrations of Composite Portraiture – The Jewish Type, reproduced in *The Photographic News* (April 17, 1885)

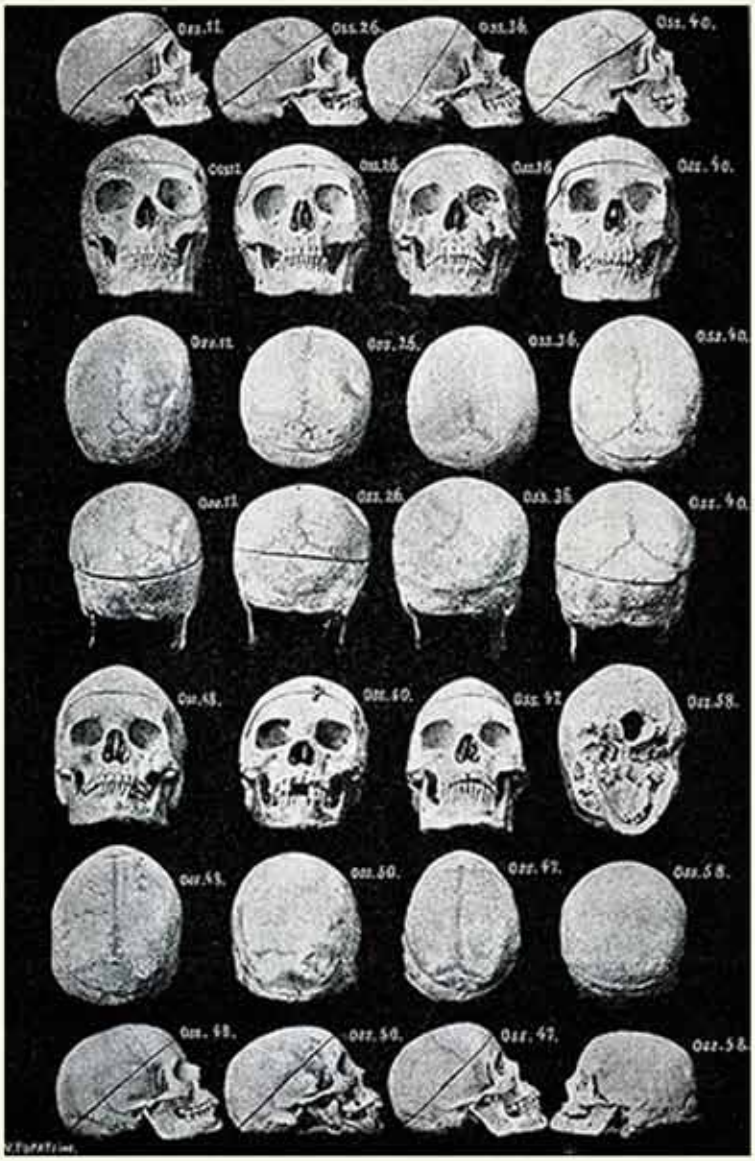
Henry Pickering Bowditch, composite image of Saxon soldiers, reproduced in "Are Composite Photographs Typical Pictures?" *McClures Magazine*, September 1894.

Galton admired Bowditch's work.

Rudolf Martin, tin of 16 glass eyes of different colors. University College London, Galton Collection

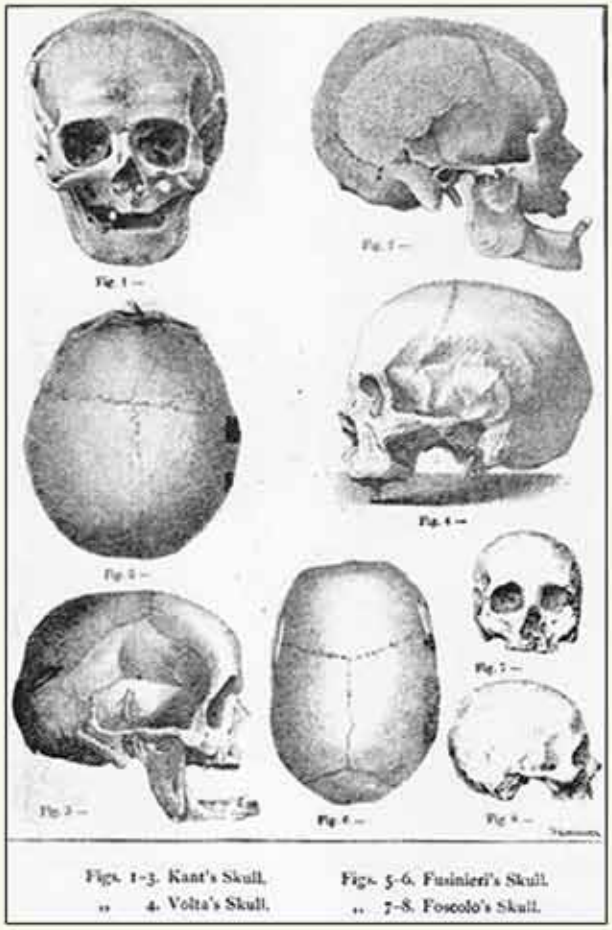
Cesare Lombroso (1835-1909)

The pseudo-science of phrenology, measuring human skulls to pinpoint character traits, was established in 1796 by the German physician Franz Joseph Gall. Eighty years later, in his book *L'uomo delinquente (Criminal Man)* from 1876, the Italian physician Cesare Lombroso claimed that people with criminal minds could be identified on the basis of skull measurement, even before they committed a crime. He used large numbers of photographs and body and facial measurements to support his theory.



Cesare Lombroso, *Criminal Man*, 1911 (originally published in Italian in 1876)
Left: skulls of female criminals; Right: (top) heads of criminals, (bottom) morally insane youths

Lombroso rejected the traditional idea that crime is an expression of free will and argued instead that social circumstances can "awaken" criminal instincts in a person who already has a criminal mindset. Criminality was inherited, according to Lombroso, and occurred among people with a lower level of evolution. Outward signs of criminality were physical anomalies such as large jaws, high cheekbones, a low and sloping forehead, a flattened or upturned nose, handle-shaped ears, hard and shifty eyes, and fleshy lips. He called these anomalies "stigmata." According to Lombroso, criminals had these characteristics in common with "lower primates, primitive man, savages, and colored races." Through his work at mental hospitals in Pavia, Pesaro, and Reggio Emilia, he also became interested in the physiognomic characteristics of mental patients. Nonetheless, Lombroso was in favor of the humane treatment of convicts, and he spoke out in favor of work programs to reintegrate criminals into society.



Figs. 1-3. Kant's Skull.
" 4. Volta's Skull.
Figs. 5-6. Fusinieri's Skull.
" 7-8. Foscolo's Skull.

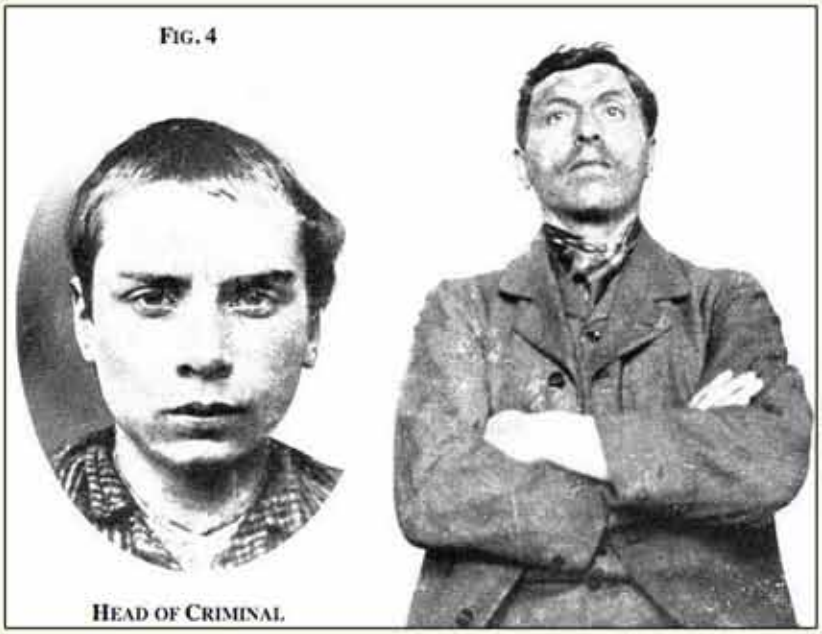


FIG. 4

HEAD OF CRIMINAL

Cesare Lombroso, *Criminal Man*, 1911 (originally published in Italian in 1876)
Skulls of the man of genius (left), and heads of criminals (right)

In 1892, Lombroso opened his own museum in Turin, which contained hundreds of skulls from soldiers, civilians, criminals, madmen and people from non-European cultures. The collection also contains brains in formaldehyde and wax models of "natural criminals," as well as countless photos and drawings. Interestingly, it also preserves Lombroso's own head in formaldehyde.

Cesare Lombroso, Lombroso's head in formaldehyde, 1909, Museo di Antropologia Criminale Cesare Lombroso, Turin, Italy

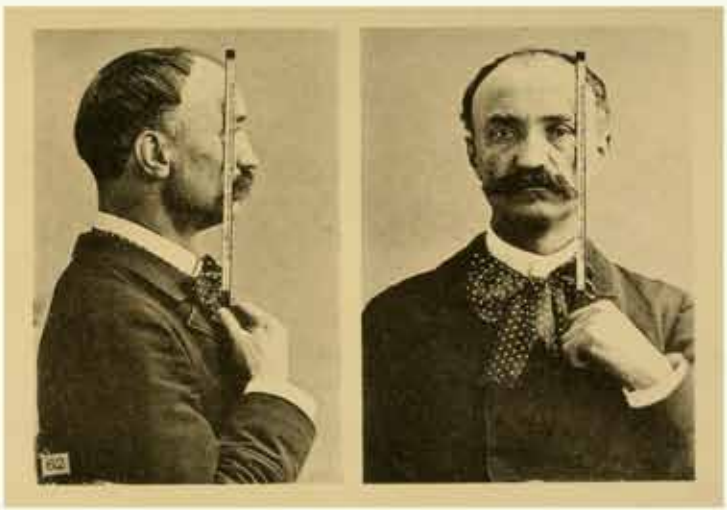
Lorenzo Tenchini, wax faces of criminals, late 19th century, Museum of Biomedical, Biotechnological and Translational Sciences, Parma (Italy). Top (from left): "falsario" (forger), "omicida" (murderer), "stupratore" (rapist); Bottom (from left): "grassatore" (robber), "ladro" (thief), and "corruttore" (corrupter).

Tenchini was a pupil of Lombroso.

Alphonse Bertillon (1853-1914)

In 1879-80, French police officer and criminologist Alphonse Bertillon created a new method for identifying suspected criminals, which was later called "bertillonage" in his honor. His system used the measurement of eleven body characteristics, such as body length, width of the outstretched arms, length of the left foot, and length of the right ear, in combination with eye color, hair color, skin color, tattoos, scars and other traits, to unambiguously identify a person.

Bertillon also standardized the photographs of suspects by identifying an ideal distance between camera and subject and by combining a frontal and a profile portrait, the practice that became known as a "mug shot" and is still used today. Since suspects could be expected to use fake names, Bertillon organized his photo documentation according to body measurements. The evident success of his method – in 1884 alone, he was able to help capture 241 repeat offenders – encouraged its quick dissemination throughout Europe and the United States.



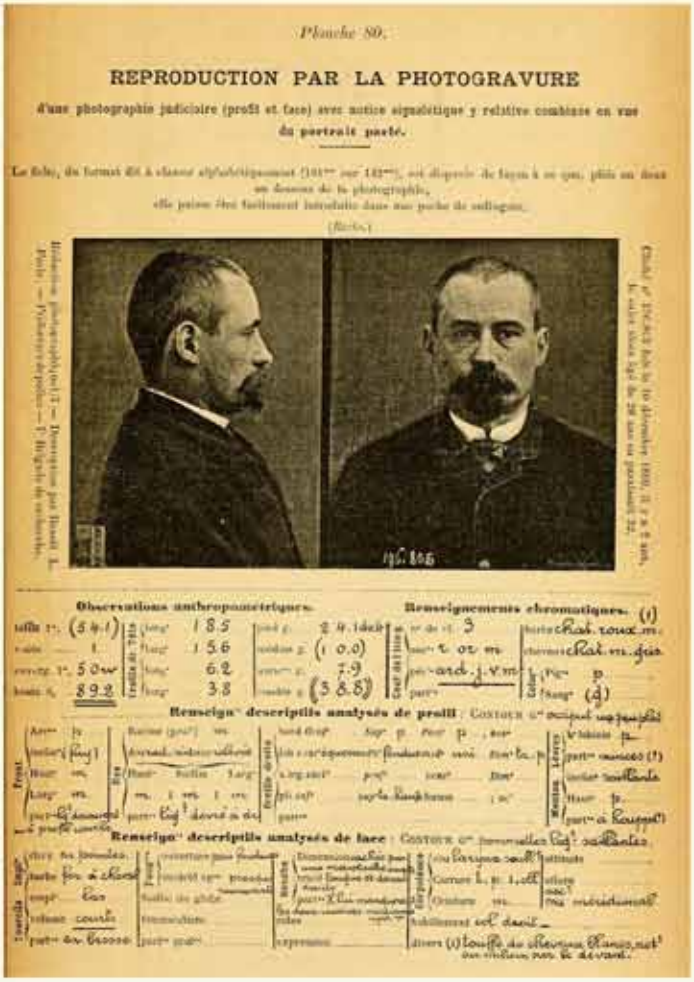


Planche 80.

REPRODUCTION PAR LA PHOTOGRAVURE

d'une photographie judiciaire (profil et face) avec notice signalétique y relative combinée en vue du portrait parlé.

Observations anthropométriques.

Renseignements chromatiques. (1)

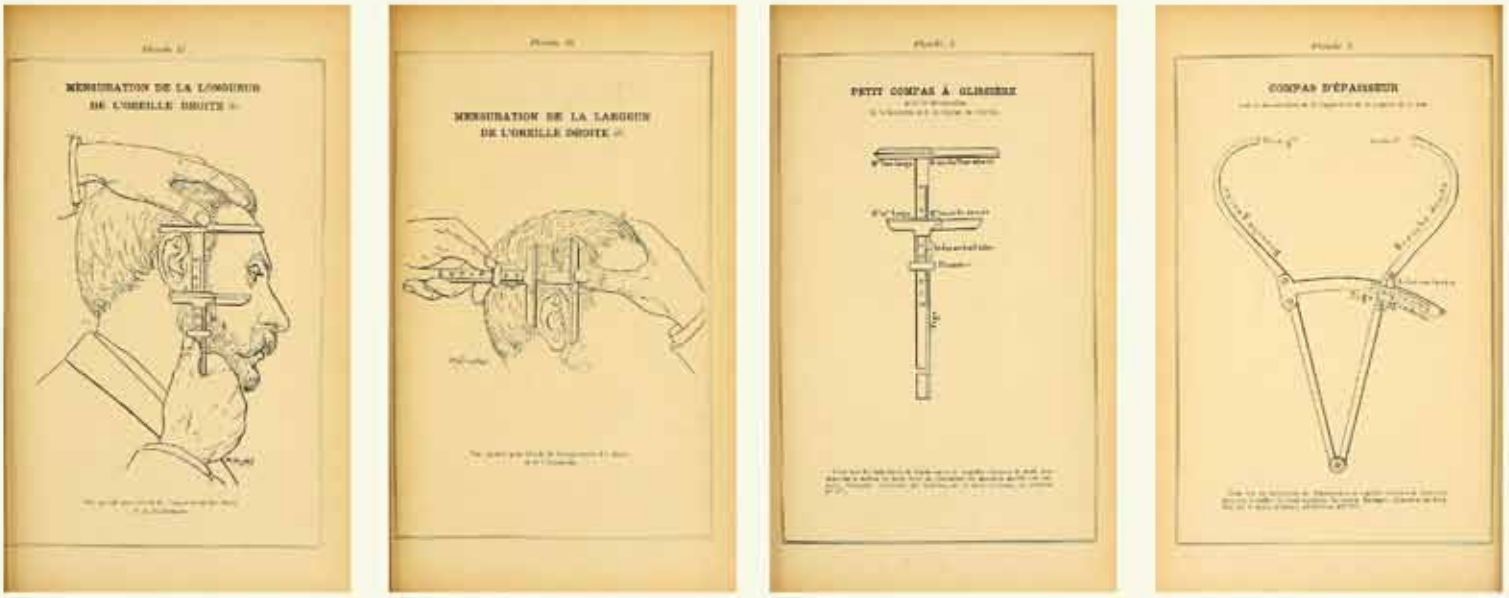
Renseign^ts descriptifs analysés de profil :

Renseign^ts descriptifs analysés de face :

Alphonse Bertillon, *Identifications Anthropométrique - Instructions Signalétique* (*Anthropometric Identifications – Descriptive Instructions*), 1893, sample file with mugshot and measurements.

In 1894 and 1899, Bertillon acted as witness for the prosecution in the trial against Alfred Dreyfus, a Jewish French officer falsely accused of high treason. As a graphology expert, Bertillon tried to prove that Dreyfus wrote an incriminating document, albeit in disguised handwriting so as to suggest that he was not the author of the document. Against towering evidence of Dreyfus's innocence, Bertillon stuck to his argument with such determination that even the French president expressed doubts as to his sanity.

In the early twentieth century, personal identification through fingerprints was recognized as both quicker and more reliable than Bertillon's method, even though his measurements often continued to be used in conjunction with fingerprints.



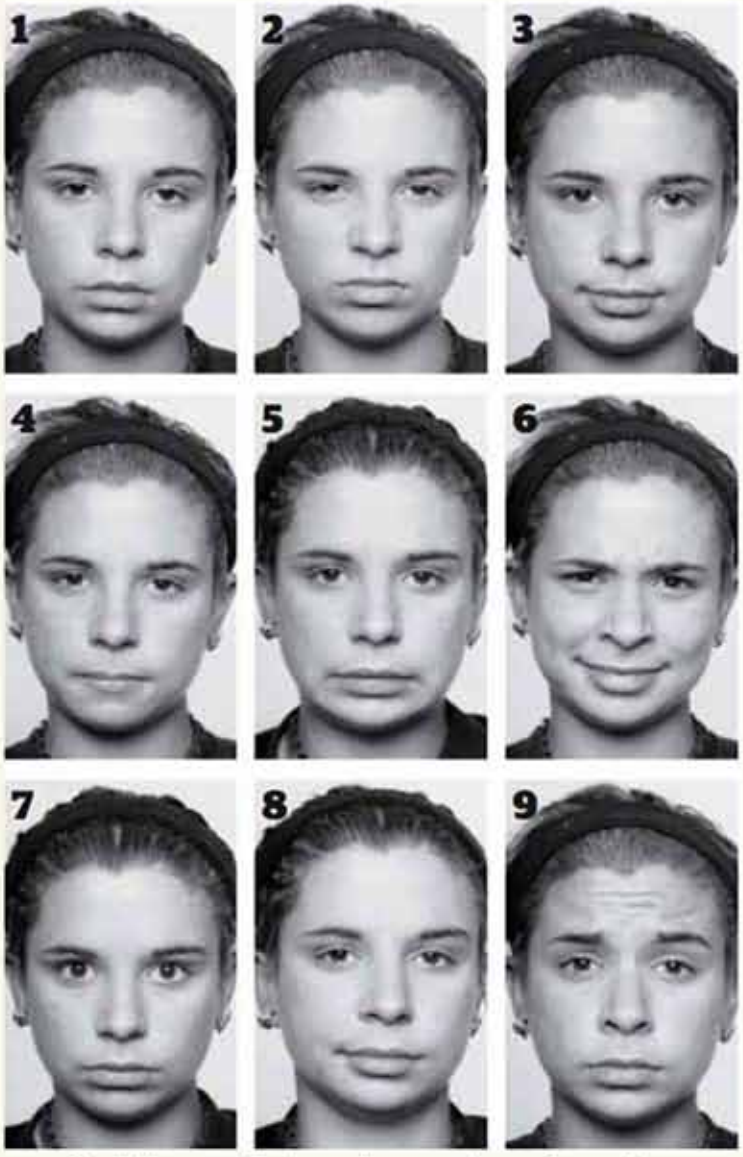
Alphonse Bertillon, *Identifications Anthropométrique - Instructions Signalétique* (*Anthropometric Identifications – Descriptive Instructions*), 1893. Tools for measuring the face, studies of the change of a human face due to beard growth, and studies of the nose.

Alphonse Bertillon, *Identifications Anthropométrique - Instructions Signalétique* (*Anthropometric Identifications – Descriptive Instructions*), 1893

Top: sample file with mug shot; middle: tableau with human irises, Wellcome Library, London; bottom: studies of the change of a human face due to aging and beard growth.

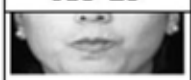
Paul Ekman (born 1934)

The American psychologist Paul Ekman is a pioneer in the study of the relationship between facial expressions and emotions. Through empirical research, he discovered that the muscular movements creating facial expressions can be reliably linked to at least six basic emotions: anger, disgust, fear, happiness, sadness, and surprise. Moreover, Ekman categorized more than ten thousand facial expressions, of which some 3,000 are directly related to emotions.



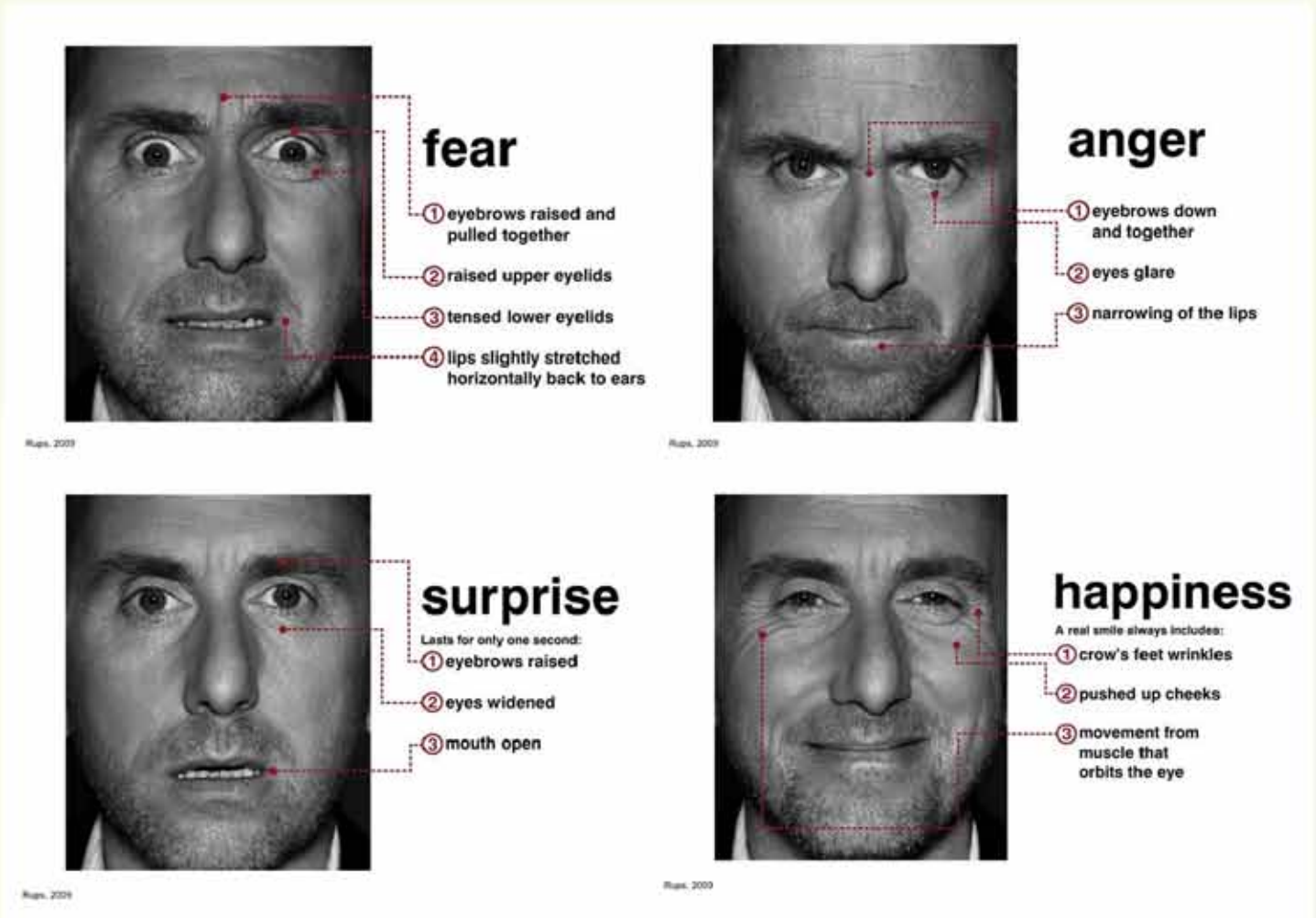
Paul Ekman, Universal expressions of emotions

In opposition to Margaret Mead and other cultural anthropologists who believed facial expressions and their meanings to be culturally specific, Ekman argued that the expression of basic emotions is universal. He based this conclusion on his research in East Asia and among pre-literate tribes in Papua, New Guinea, confirming Charles Darwin's hunch that emotions are biologically, not culturally determined. However, Ekman and his colleague Wallace Friesen acknowledged that there are very specific norms and values at work in different cultures that decide how, when, and to whom emotions might be expressed.

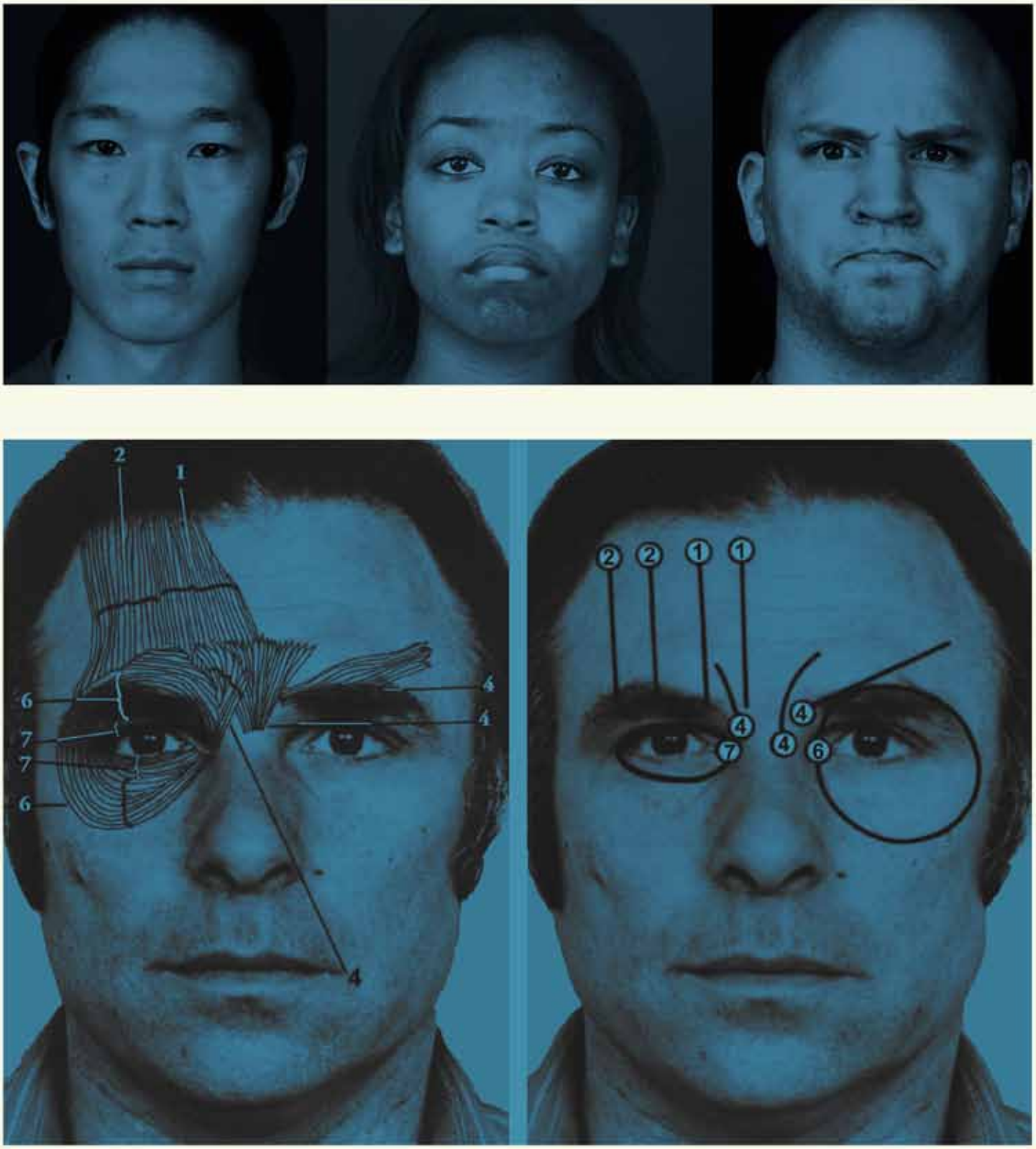
Upper Face Action Units					
AU 1	AU 2	AU 4	AU 5	AU 6	AU 7
					
Inner Brow Raiser	Outer Brow Raiser	Brow Lowerer	Upper Lid Raiser	Cheek Raiser	Lid Tightener
*AU 41	*AU 42	*AU 43	AU 44	AU 45	AU 46
					
Lid Droop	Slit	Eyes Closed	Squint	Blink	Wink
Lower Face Action Units					
AU 9	AU 10	AU 11	AU 12	AU 13	AU 14
					
Nose Wrinkler	Upper Lip Raiser	Nasolabial Deepener	Lip Corner Puller	Cheek Puffer	Dimpler
AU 15	AU 16	AU 17	AU 18	AU 20	AU 22
					
Lip Corner Depressor	Lower Lip Depressor	Chin Raiser	Lip Puckerer	Lip Stretcher	Lip Funneler
AU 23	AU 24	*AU 25	*AU 26	*AU 27	AU 28
					
Lip Tightener	Lip Pressor	Lips Part	Jaw Drop	Mouth Stretch	Lip Suck

Paul Ekman, Chart of facial Action Units (AU)

Ekman and Friesen also mapped various ways in which certain emotions are revealed in a person's face. This depends on such factors as intensity of feeling, attempts to control the emotion, and its stimulated or spontaneous character. In 2001, Ekman collaborated with British actor John Cleese for the BBC documentary series "The Human Face;" the 2009 television series "Lie to Me," featuring the actor Tim Roth, is largely based on Ekman's research. Ekman's groundbreaking work was the basis for present-day companies focusing on software that can identify viewer emotional reactions to entertainment, marketing, and advertising.



Actor Tim Roth playing Dr. Cal Lightman in the television series *Lie to Me*, based on Paul Ekman's and Wallace Friesen's Facial Action Coding System (FACS), 2009



Paul Ekman, Wallace Friesen, and Joseph Hager, Charting the muscles underlying facial expressions

Facial Recognition in the Digital Age

One of the difficulties of Bertillon's system of facial recognition was the sheer abundance of available materials, which were hard to organize by hand. The rise of the computer promised to solve this problem because digitized information could be easily categorized and shared. However, computer identification is not without problems. Differences in lighting and perspective, and variations due to aging or the use of make-up, make it hard for a computer to reliably identify individual faces.

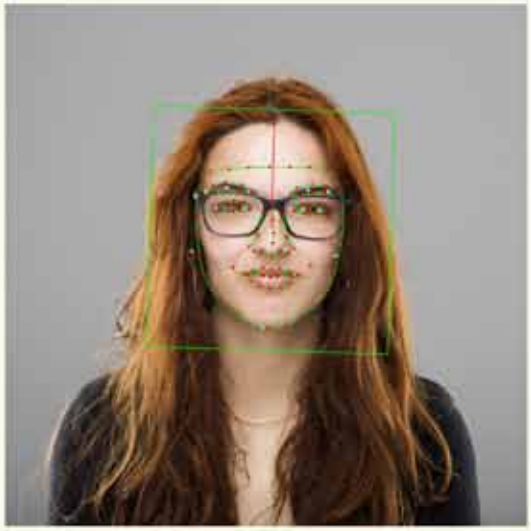
In spite of a relatively meager success rate, facial recognition technology received an enormous boost following 9/11 and the wars in Afghanistan and Iraq. Companies suggested that their technology would help prevent terrorist attacks and create a safer environment. Since the start of the 21st century, enormous amounts of money have been invested in improving facial recognition technology.

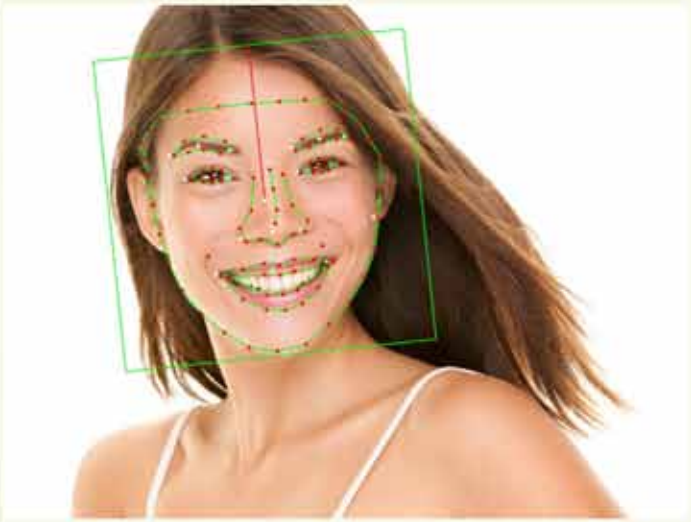
Also on the rise are applications that identify emotions through facial expressions. Japan and the Netherlands are at the forefront of developments in software that allow computers to predict consumer behavior based on facial analysis. The Japanese company Omron sells "smile-scan" technology that allows service industry firms to evaluate the quality of their employees' smiles.

A serious concern about facial recognition technology is its impact on individual privacy. Governments collect data that can be used to control their citizens and restrict their freedom; companies might use surveillance information to cater to their customers' subconscious desires. Moreover, privacy-sensitive information might reach criminals, or employers who can use it against their employees (or vice versa). Facial recognition technology is far from being universally accessible – its implementation far from universally accepted.

Ayonix is a Japanese company specializing in software that identifies gender and age. In these pictures, faces are analyzed for age and matched with a database of preexisting images to facilitate the identification of a person.

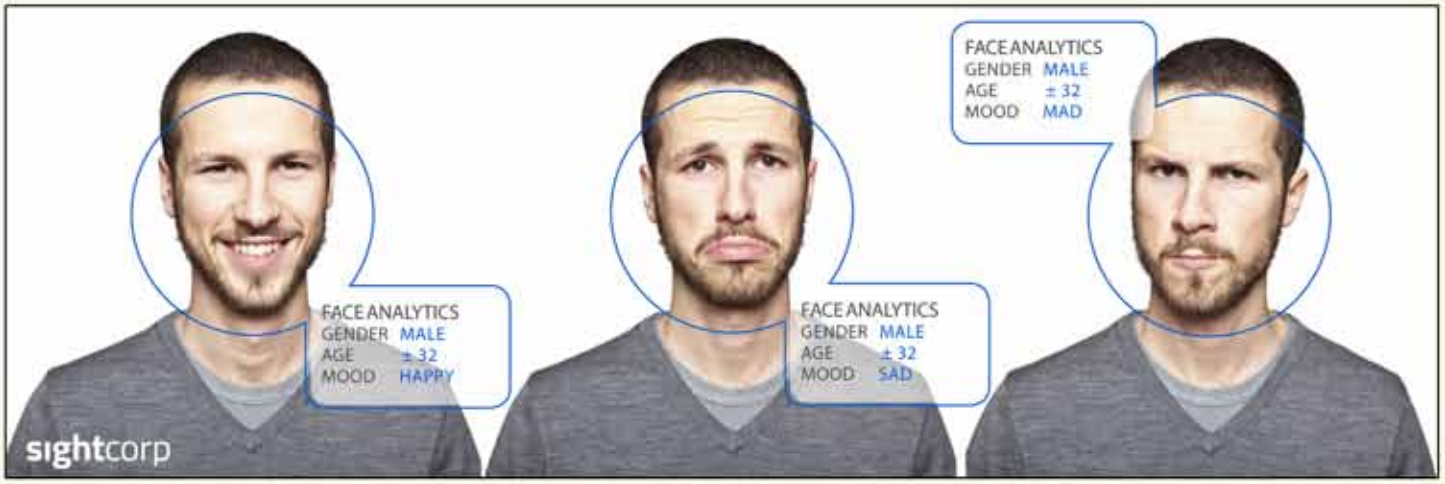
The German company **Betaface** has developed facial recognition technology used for video and image archives, web advertising and entertainment projects, and video surveillance. These images show the "facial landmarks," called nodal points, such as the distance between the eyes, the shape and size of the nose, and the jaw line, that facial recognition software uses to recognize and map a face.





Herta Security, a Spanish company, provides facial recognition technology for airports and metro stations, as well as prisons, casinos, sport stadiums, and military applications. In these pictures, faces are singled out from a crowd and matched to an image database for identification.

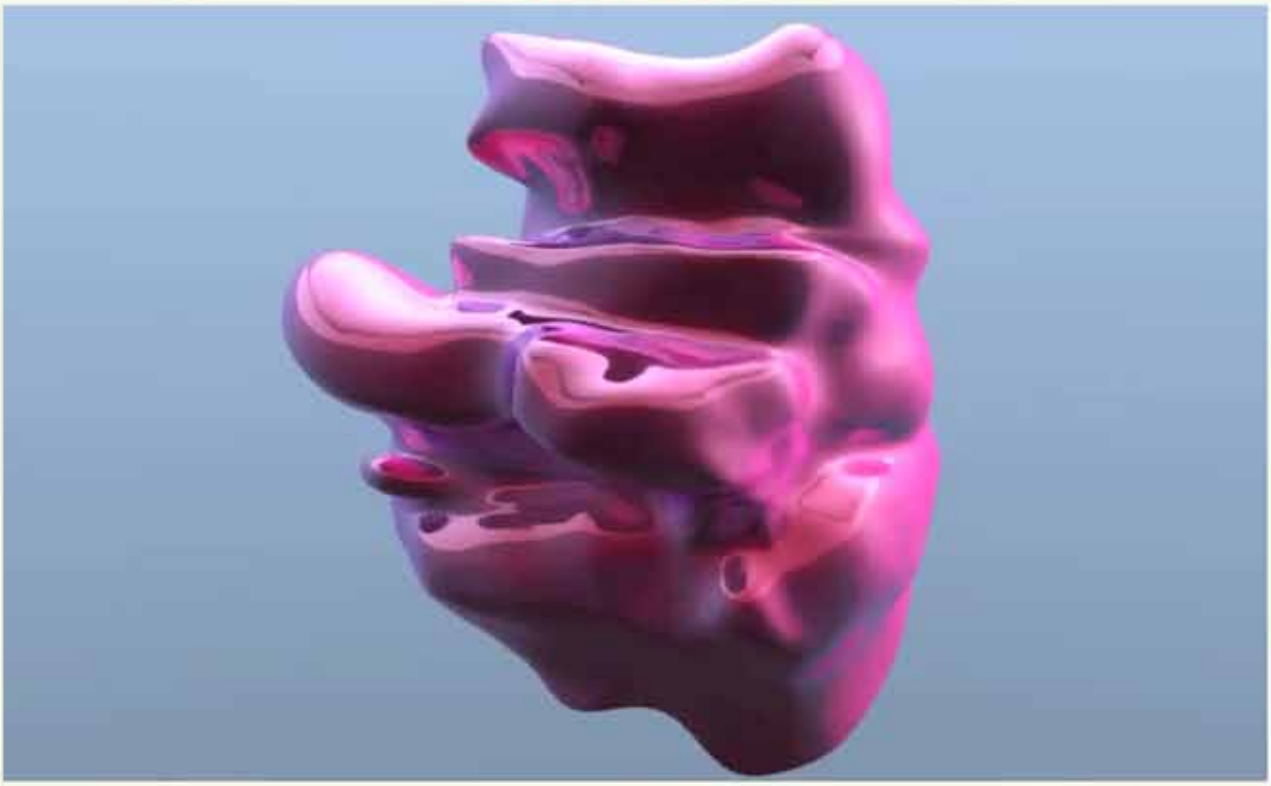
Dutch company **Sightcorp** develops algorithms that make it possible to understand customers' interests, profiles, and deep subconscious responses to stimuli in real-time. In this image, individual faces from a crowd of people are tagged with an ID number, and analyzed for age, gender, and emotional state. The intensity of each basic emotion is indicated by a colored bar.



Zach Blas

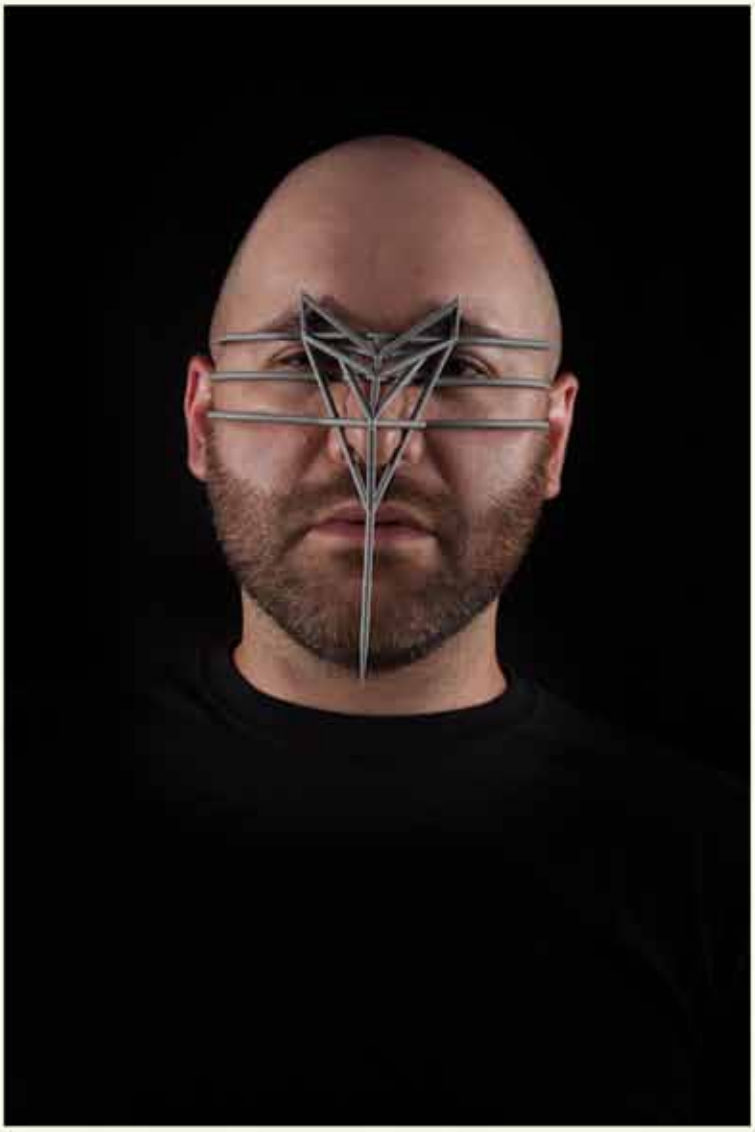
The *Facial Weaponization Suite* develops forms of collective and artistic protest against biometric facial recognition, and the inequalities these technologies propagate, by making masks in community-based workshops that are used for public intervention. One mask, the *Fag Face Mask*, is a response to scientific studies that link determining sexual orientation with facial recognition. This mask is generated from the biometric facial data of many queer men's faces, resulting in a mutated, alien facial mask that cannot be read or parsed by biometric facial recognition technologies.

Zach Blas, *Facial Weaponization Suite: Fag Face Mask*, October 20, 2012, Los Angeles, photograph by Christopher O'Leary

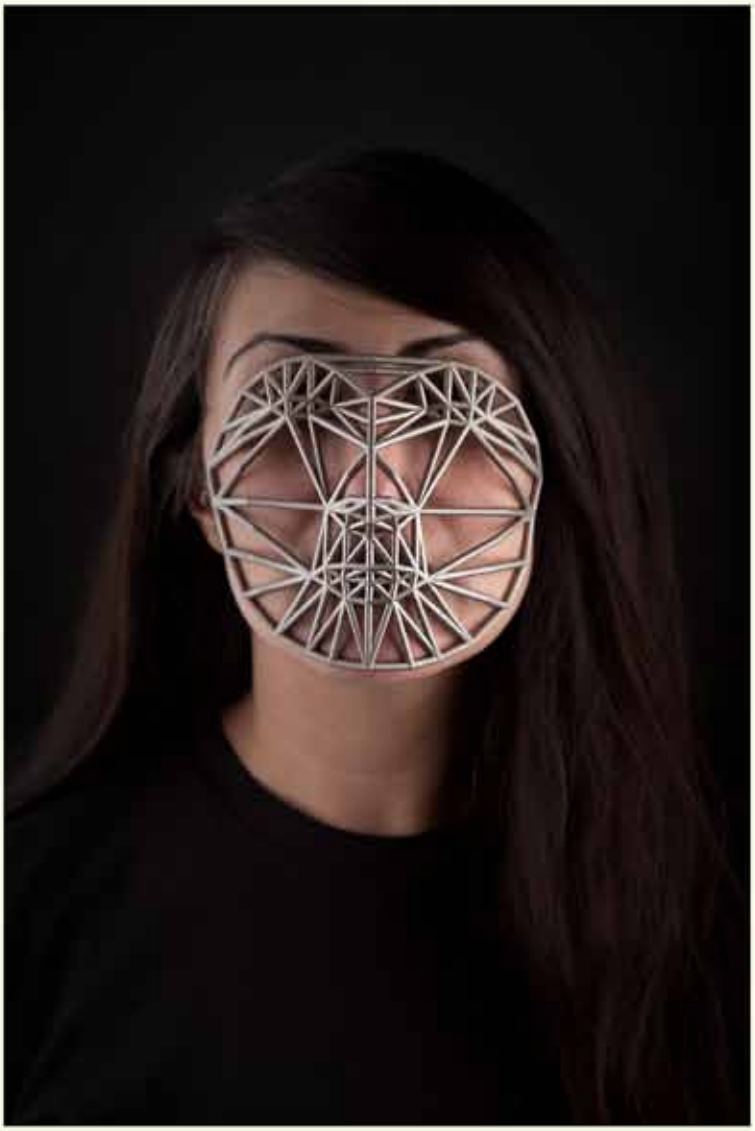


Zach Blas, *Facial Weaponization Communiqué: Fag Face*, video, 2012

Face Cages is a critical dystopian installation in which biometric facial diagrams are fabricated as metal objects that resemble torture devices. These "cages" are then used in endurance-driven performances to dramatize the irreconcilability of the standardized biometric diagram with the materiality of the human head.



Zach Blas, *Face Cage #1: endurance performance with Zach Blas*, 2014, photograph by Christopher O'Leary



Zach Blas, *Face Cage #2: endurance performance with Elle Mehrmand*, 2014, photograph by Christopher O'Leary

Kathleen McDermott

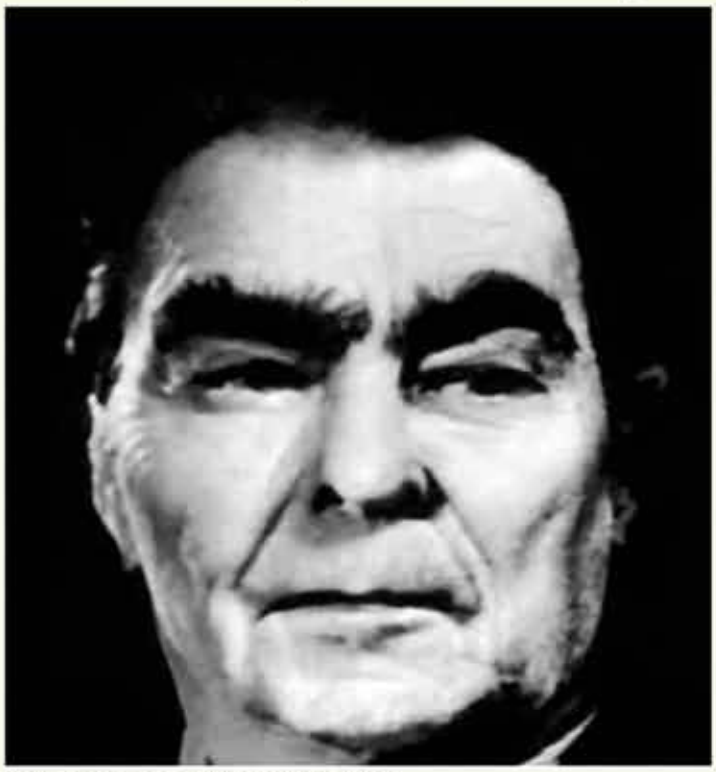
Urban Armor is a series of playful electronic artworks by McDermott, investigating the relationship between technology, the body, and personal and public space. *Miss-My-Face* is a hat with attached veil, lined with infrared LEDs. The hat is paired with a matching purse, which contains a CCTV detector. The CCTV detector looks for radio frequency waves used by wireless CCTV transmitters. When a frequency is detected, it turns on the infrared LEDs, which interferes with the ability of a camera to read the subject.

Kathleen McDermott, *Urban Armor # 3: Miss-My-Face*, 2014, Arduino, CCTV detector, LEDs, fabric, video

Kathleen McDermott, *Urban Armor # 3: Miss-My-Face*, 2014, Arduino, CCTV detector, LEDs, fabric, video

Nancy Burson

In her composite gelatin silver prints from the early 1980s, Burson manipulated and digitally combined portraits of well-known individuals like movie stars and world leaders to critically examine issues of politics, gender, race and conceptions of beauty.



Nancy Burson, *Warhead I*, 1982

Composite image of world leaders, weighted to indicate the number of nuclear warheads under each individual's command: Ronald Reagan 55%, Leonid Brezhnev 45%, Margaret Thatcher less than 1%, François Mitterand less than 1%, Deng Xiaoping less than 1%

Nancy Burson, *Mankind*, 1983-1985

Composite of images from a 19th-century book of racial stereotypes reflecting world population statistics

Nancy Burson, *First and Second Beauty Composites*, 1982

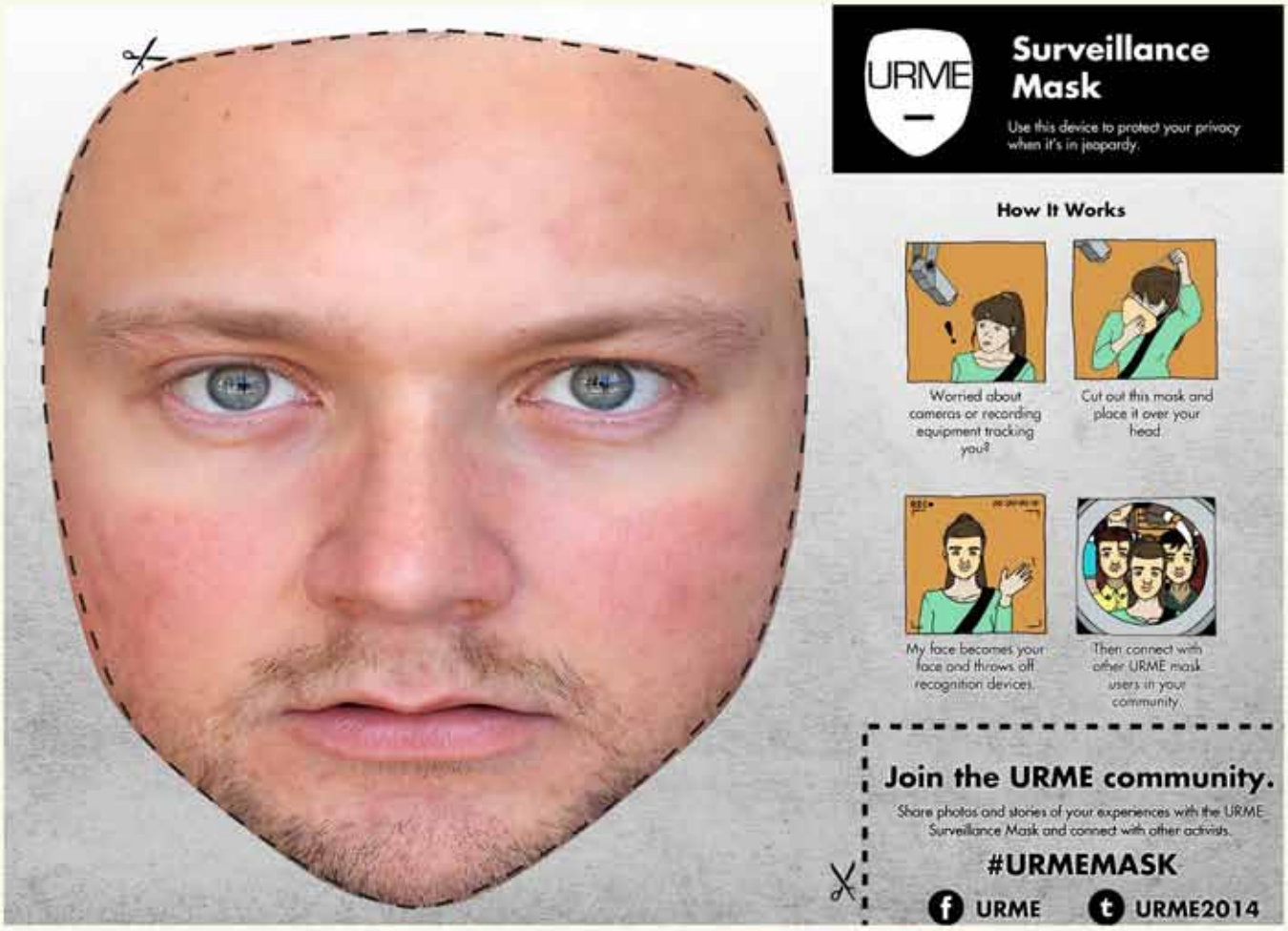
Left: Bette Davis, Audrey Hepburn, Grace Kelly, Sophia Loren, Marilyn Monroe
Right: Jane Fonda, Jacqueline Bisset, Diane Keaton, Brooke Shields, Meryl Streep

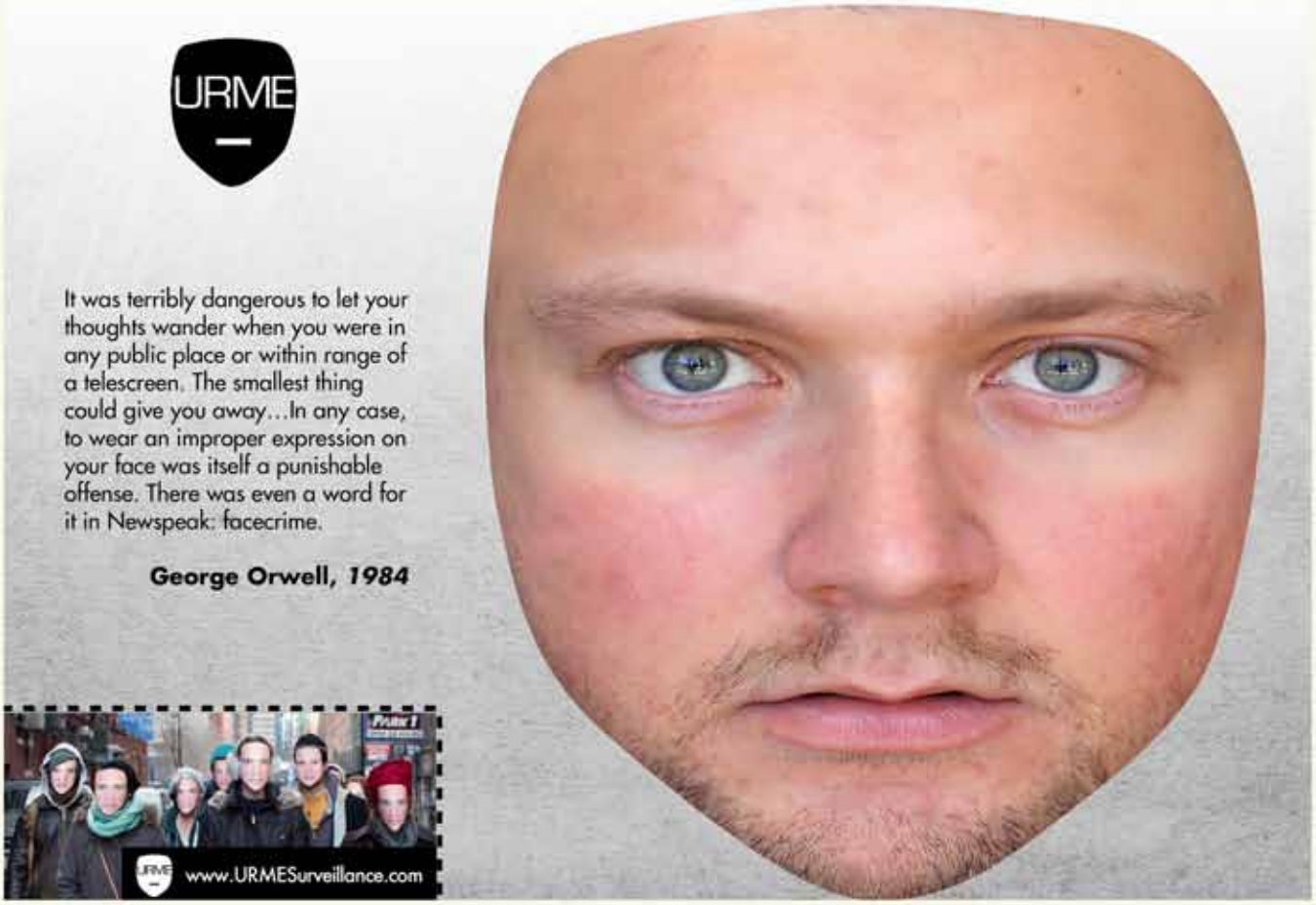
Leo Selvaggio

URME Surveillance is an interactive and sculptural installation that asserts the artist's identity as a defense technology against surveillance. *URME Surveillance* challenges viewers to consider the malleability of their identities by corrupting the artist's. This work invites the visitors to assume Selvaggio's identity by allowing them to wear his face as either a prosthetic, paper mask or digital substitute.

Leo Selvaggio, *URME*, 2013, prosthetic 3D-printed mask, nine convex surveillance mirrors, photographic documentation

Leo Selvaggio, *URME*, 2013, prosthetic 3D-printed mask, nine convex surveillance mirrors





Leo Selvaggio, *URME*, 2013, paper masks

Leo Selvaggio, *URME*, 2013, photographic documentation


Ioana Tudor

Netherlands-based and Romanian-born performance artist and theater-maker Ioana Tudor presented *About how my emotions were stolen by the machine. While I was just sitting there, reading about my father,* in response to the exhibition *Facial Recognition*, on Sunday, March 6 and on Friday, March 11 at The Wende Museum.

Tudor relates the invasion of privacy in communist Romania to contemporary privacy issues in times of mass surveillance and social media in the West today. During her theatrical monologue, which included private family history and documents, her face was analyzed by the most advanced emotion recognition software.



Images from March 11 performance. Top left: Emotional recognition software analyzing Tudor's face.

THE WENDE MUSEUM

Facial Recognition was organized by Chief Curator Joes Segal.

The exhibition concept was developed by Marieke Drost and Joes Segal.

Special thanks to John Ahouse, Russel Altamirano, Zach Blas, Peter Bochmann, Nancy Burson, Iris Clever, Sophie Kühnlenz, Kathleen McDermott, Leo Selvaggio, and Josh Todarello, and to Facial Recognition Technology companies Ayonix, Betaface, Cognitec, Ex-Sight, Face-Six, Herta, Imotions, Luxland, and Sightcorp.

The *Facial Recognition* catalog was edited by Donna Stein and designed by Amanda Roth.

Learn more about the objects in this exhibition by visiting our online catalog at <http://www.wendemuseum.org/collections/main.php?module=objects>.

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