

Her Cell Phone: Called one of the most beautiful women of all time, she was a glamorous 1940's Hollywood movie star cast in sultry roles by the male moviemakers of the decade. But, she also was a polymath with a high IQ.

During that same decade, she patented frequency hopping, a highly efficient way of using multiple radio frequencies simultaneously without interference to each other. It is the basic technology of all wireless communications i.e., cell phones, faxes, bar code scanners, computers, e-mail, the internet, etc. Today it is known as spread spectrum. But in the 1940s, no one was interested.

Hedy Lamarr (Hedwig Eva Maria Chiseler) was born into a wealthy Jewish family in 1913 Vienna. Her mother was a concert pianist, her father a bank director. Hedwig studied piano and ballet at age 10. She attended finishing school and studied theatre in Berlin. But it was the new technology of the cinema that captivated her. She dropped out of school at 16 and began her career with a bit role in a German movie. Her (scandalous at the time) performance in the 1933 film *Ekstase* received international but notorious attention.

She married Austrian arms manufacturer and millionaire Fritz Mandrel when she was just 19. She was his trophy wife. He had her accompany him almost everywhere, even to his meetings with arms technicians and his business partners where she heard discussions about advanced technology to be used in weaponry for the pending Nazi war.

But by 1937 she had heard enough. She grew to hate the Nazis as well as her domineering husband. She walked out on her husband, escaped to Paris, received a divorce, and moved to London. She left behind wealth and a promising film career she but kept with her, her detest for the Nazis and the war that was brewing in her homeland.

In London she met Russian-born American Metro-Goldwyn-Mayer film producer Louis B. Mayer who was well aware of her and her notoriety. He was a prude when it came to his studio's films, but any "moral" concerns he may have had seemed to override the money he knew her notoriety would bring into the studio. He gave her a Hollywood movie contract, changed her name and supposedly insisted she make wholesome films. Hollywood, however, continued to cast her in seductive roles where she seemed to feel uncomfortable. She is quoted to have said, "Any girl can be glamorous. All she has to do is stand still and look stupid."

In Hollywood Lamarr met American composer George Antheil who had an earlier European music career. He moved to Hollywood to write film scores where he also wrote for *Esquire* magazine. He himself was notorious due to his avant-garde machinelike, rhythmically propulsive compositions and was dubbed "the bad boy of music." But he was a musical Picasso. His French *Ballet Mécanique* for percussion ensemble included airplane propellers, electric bells, and a siren. It broke with convention and created an uproar at its 1927 American premiere at Carnegie Hall.

Antheil as Lamarr was a polymath. They were neighbors who engaged in technical discussions including war weaponry and the pending war. In a 1939 article for *Esquire*, he accurately described the direction the war in Europe would take.

In 1940 as they were playing notes on a piano, they were changing keys in unison when Lamarr realized they were talking to each other over a range of tones each separate from the other. She knew at that moment if translated into radio frequencies to be used in war, it would keep the enemy from locking onto a signal and jamming it.

They sought advice from an electrical engineering professor at the California Institute of Technology and worked for months on a sophisticated anti-jamming device that could be used in radio-controlled torpedoes. In 1942, Lamarr just 26 and Antheil were jointly awarded U.S. Patent Number 2,292,387 for their "Secret Communications System" and donated it as their contribution to the war effort. Antheil later credited the original idea and patent entirely to Lamarr.

The U.S. formed the National Inventions Council and Lamarr requested a volunteer position. But neither her invention nor her intelligence would be implemented during World War II. The U.S. military men in power thought she could better help the war effort by selling war bonds for which they used her beauty and her sexy persona. And they proved to be right. She sold millions of dollars worth of war bonds. But history also proved them to be wrong not to have used her intelligence.

Twenty years hence during the Cuban Missile Crisis, her invention, using the transistor technology of the late 1950s, was installed on ships sent to blockade Cuba in 1962, three years after her patent expired. Today, her "Secret Communications System" is used extensively in military communications and for all wireless devices now commonplace.

Neither Lamarr nor Antheil, who died in 1959, received recognition, compensation or thanks until 1997 when they were awarded the Electronic Frontier Foundation Pioneer Award, and Lamarr became the first female recipient of the prized BULBIE Gness Spirit of Achievement Bronze Award (the "Oscar" of inventing) given to individuals whose creative lifetime achievements in the arts, sciences, business, or invention fields have significantly contributed to society or the earth at large, literally the world wide web.

As her beauty waned so did movie roles and Lamarr woefully lived out her later years. After her death in 2000 at age 85, according to her wishes, her ashes were spread (spectrally) in the Vienna Woods air sans cell phone interference.

Sources: Sources: *Feminine Ingenuity: Women & Invention in America*, Anne L. MacDonald; "Brainy Beauty," Ron Grossman, Chicago Tribune, 3/31/97; www.german-way.com/cinema/bio-hedy-lamarr.html; <http://www.inventionconvention.com/americasinventor/dec97issue/section2.html>.