Einstein

Einstein was born in 1879. In 1896, age 17, he entered the Zurich Polytech. At that time an institution like CNM. It is only in 1897 that it became the famous ETH. The University was tuition free... but not the application for Swiss citizenship - he had to put money aside every month to be able to afford the application fees. Got Swiss in 1901. Excused of military service for (i) sweety feet; (ii) flat foot (iii) varicose veins. Hard to believe: he used to hike with his girlfriend from Switzerland to Como lake across the Alps.

He fell madly in love with Mileva Marvic, a Serbian lady who was the only female in the Zurich Polytech. They communicated not by e-mail or social media, but by snail mail. Scattered among the expressions of love and poetic paragraphs were always some discussion about physics papers. He was bubbling with ideas, and submitted two research paper project which were rejected... because he did not bother to check the literature.

(Ming Lai was the same while Mike Dennis was just the opposite. Before starting any project, he checked the literature as far as the time of the invention of the wheel, and ended up discouraged).

Thesis projects

The first project Einstein proposed was to check the existence of ether by a Michelson interferometer. That was ignoring the fact that it had been done (the Michelson Morley experiment). Then he submitted a project on heat and electric charges transfer. He had to settle on heat alone.

Getting an RA?

He was definitely not an ass licker (unlike ...). He antagonized so much professors that he could not get an assistantship. He begged a Chemistry Professor, Ostwald 1901 Nobel prize for ?dilution?) for an assistantship. Never a response. Nobody would take him as a graduate student. He was living from tutoring for 4 years. Nobody would give him a recommendation. In these tough times his daughter Lieserl was born (January 1902).

Patent examiner

The same year in June his friend Grossman (Math) got him a job at the Patent office. Instructions fitted him well: "Do not believe anything you get to evaluate". He finished his pile of patents in 1/2 day, then went on to study physics, founded a book reading club "The Olympic Academy" with two friends. As a "Beamte" (civil servant) he could not admit having a child out of wedlock. So Liserl remained such a well kept secret, that, to this day, it is not known if she survived scarlet fever at the age of 2. The parents of Einstein never knew of her existence either. They hated Mileva Marvic ...

Trying to find a unifying theory

Einstein wanted to find a unifying theory, inspired by Kinetic theory of gases (Boltzman), Capillarity, Electron gas)(Drude) and photoelectric effect. He was an enthusiast self-learner and communicator. He wrote to Drude, to Boltzman and many others, first telling that he admired their work, but ...offering to correct their mistakes. That usually did not go well.

Procreation and production

The patent office years were the most productive, both in physics and procreation. He had another son Hans Albert Einstein in 1904. He made enough money (more than an assistant Professor salary) at the patent office that he could afford to marry (so no need to hide the son). Second son Edward born in 1910.

1905 first breakthrough, inspired by all of the above: an nterpretation for the mysterious measurements of Max Planck about blackbody radiation. Max Plank could fit the blackbody spectrum to a function, inspired by Boltzman distribution. Einstein introduced the quantum of light - much later called the photon – to explain photoelectricity and blackbody radiation.

Peak productivity in 1905 to 1908, where as patent examiner he explained photoconductivity, light quanta, Brownian motion, special relativity and general relativity.
Light quanta - inspired by Plank's blackbody formula.
Special relativity - inspired by the Lorentz transformation.
$E = mc^2$ came in 1905 as a natural consequence of special relativity.

General relativity was in competition with Hilbert.
Brownian motion: explained the random walk (a drunkard after 100 steps would have moved only 10 steps away from a lamp-pole), an the fact that tiny molecules can result in observable motion of micron size particles.

Transformative versus evolutionary research

All discovery were a natural evolution of science. So far for NSF distinction between "transformative' versus "evolutionary" research!
With all these papers he still did not have a Doctorate. He finally wrote a habilitation thesis in 1908, and left the patent office to get a Professor position.

The Nobel prize saga

By 1910 he was already famous, and nominated for Nobel prize by... Oswald. From 1910 t0 1922 he was nominated every year. The Nobel prize committee rejected him every year.

One member of the committee was Lenard, the discoverer of the photoelectric effect who is quoted as saying: "Relativity is not a discovery, but philosophical conjecturing typical of Jewish sciences".
In 1920 Einstein turned down a request by the committee chair to come to Stockholm, because he had an invitation to Japan. Thus the 1920 prize went to the director of the international bureau of weights and measures, for having developed a stable alloy! The same Nobel laureate vehemently opposed that the 1921 prize went to Einstein for relativity: he was particularly upset that the standard of length could depend on the motion of the frame of reference! (a result of special relatvity).
So there was no Nobel prize winner in Physics awarded in 1921. By 1922, it had become an embarrassment, not to Einstein, but to the Nobel prize committee. The objections were multiple, but the committee chair was a skilled negotiator. It could not be awarded for the discovery of light quanta, because that contradicted the continuity

implied in Maxwell's equations.
It could not be for relativity.
It was thus awarded for "THE DISCOVERY OF THE LAW OF PHOTOELECTRIC EFFECT".
The kinetic energy of the electron is proportional to the light frequency. This is directly related to the quantum of energy of light, but the word "quanta" was carefully avoided. No matter, in his acceptance speech, Einstein talked only about ... relativity!
That was in 1922. The 1921 prize was retroactively awarded to Niels Bohr.

Nobel prize 1 M$
PGA Golf tournament prize: 18 Million
Soccer contract: 300 M$/year
Which one of these three made a contribution to humanity?

Where did the Nobel prize end up?

He did not keep the Nobel prize: he gave it to Mileva Marvic. To understand how that came about we have to go back 10 years.

How come the explosion of productivity? A happy private life with wife Mileva Marvic? Just the opposite. From partner in science she was shoved to the exclusive responsibility of taking care of the children. With increasing tension in the couple Einstein took refuge in his work, which made matters worse. Soon he got a mistress in Berlin, Elsa (his cousin) who had a daugther Ilse. During the war, Einstein tried to convince Marvic to divorce - she resisted. It took until 1918 to come to an agreement: she accepted to divorce in exchange for the Nobel prize, when and if he gets it. The week after the divorce seems to have been the most bizarre negotiations. A letter of Ilse - then 20 years old - seeks advice about pre-nuptial discussion: should Einstein marry the mother or the daughter? He finally settled for the mother...