



Q&A from City of Fremont's MFG Day 2020

October 2, 2020

Question	Answer	Company
What made you choose this career path?	Matt: I've always like building things, so Engineering was a great option. I love working with medical devices since the outcome is so positive: saving lives!	Evolve
How do internships work now with COVID-19?	Evolve: Internships are the same as before, expect that, for all employees, there are more screening tests to make sure everyone is healthy. We treat our interns as regular employees.	Evolve
What is the most exciting thing about working in manufacturing?	Matt: Seeing a tangible device that is built as intended is very satisfying! Being able to develop a way to make thousands is even better.	Evolve
Did you complete graduate studies? Also what was your major since there are multiple types of engineering?	Matt: Yes. I started with getting a Bachelors in Mechanical Engineering. After working for a couple years I went to school parts time (evening classes) to get an MBA in Finance.	Evolve

<p>Do any of the companies presenting here offer unpaid internships?</p>	<p>Evolve: No, all internships are paid. However, if a company isn't able to support internships due to cost, Fremont or local Colleges are sometimes able to help out with grant funding.</p>	<p>Evolve</p>
<p>What are the educational requirements for internships?</p>	<p>We don't have specific requirements but prefer candidates enrolled in a college program who have an interest in electronics or advanced manufacturing.</p>	<p>Bay Area Circuits</p>
<p>Do you think that manufacturing will eventually become fully automated? Based on your experience, what could be some drawbacks of a fully automated manufacturing process?</p>	<p>There's a clear trend towards automation and even as a small business we have put significant emphasis on automation for both our electronic and manufacturing processes. This is shifting our operator's skillsets and instead of being artisan-like they are now learning to become computer-based operators. We believe this also helps them increase their value as employees since they can more easily cross-train between departments and processes. The drawback for some employees is that they may not all have the desire or technical acumen to make the transition from artisan to computer-based operator. However, this is also creates opportunities for new workers with these technical skillsets to enter the manufacturing industry.</p>	<p>Bay Area Circuits</p>
<p>Do you make your own PCB stencils in house?</p>	<p>No, we have an industry partner who manufactures metal stencils and we resell them as a convenience to our prototyping customers. Since many of our customers are PCB assembly companies with their own sources for stencils, this is not a big part of our business.</p>	<p>Bay Area Circuits</p>
<p>Does Bay Area Circuits make computer motherboards?</p>	<p>We manufacture the bare printed circuit board (without components attached) for many different types of products including motherboards. Many times, we don't know exactly how the printed circuit board we're manufacturing will be used. We're considered a service-based manufacturer so we'll receive electronic design data from a customer along with a fabrication drawing which will detail the requirements for the PCB and then our engineering team creates a set of instructions for how the PCB should be manufactured to meet our customer's requirements.</p>	<p>Bay Area Circuits</p>

<p>How much creative freedom is there in the job?</p>	<p>I would say there is very little creative freedom in our business, meaning, we didn't design the products we're manufacturing; we're building someone else's idea or design. However, we're challenged by our customer's ideas and designs every day and there is a lot of critical thinking and problem solving required. For us, there's nothing more rewarding than helping a customer prototype the next big idea!</p>	<p>Bay Area Circuits</p>
<p>How old do you have to be an intern at a Tesla?</p>	<p>Interns must meet the requirements listed on the internship application. Tesla believes in hiring the best talent in the world and will ensure opportunities are available to both students and non-students. Please visit [tesla.com/careers]tesla.com/careers for more information about Tesla internship programs and employment opportunities.</p>	<p>Tesla</p>
<p>Can you share some highlights from Tesla's battery day?</p>	<p>We're excited to present a new battery design that has increased energy, range and power. Innovations in cell design, production and materials will make it possible to halve the cost per KWh. During the presentation, Elon states "About three years from now, we are confident we can make a very compelling \$25K electric vehicle that is also fully autonomous." Please watch the full Battery Day presentation on our YouTube channel for more details.</p>	<p>Tesla</p>
<p>How does it feel to be a woman in engineering (for Brenda)?</p>	<p>Thank you for the question, I am a tour guide and while not an engineer by trade, I do have many female friends that are engineers. I am also part of Women in Tesla and am in constant awe of the team's dedication to achieve innovations in engineering, design and manufacturing. Tesla is an imaginative space where original ideas are valued, celebrated and needed to accelerate the world's transition to sustainable energy. To learn more about the Tesla team and our mission, please check out our 2019 Impact Report.</p>	<p>Tesla</p>

<p>Given the tight physically tight environments of various workspaces, what protocols are put in place if one of the equipment, machines/robots was to malfunction?</p>	<p>It depends on the equipment. For example, the height of the building caused us to design a failsafe system into our injection press which monitors the overhead crane that we use. If the crane is engaged and moved over the press and the robotic tooling that removes the part from the press was in operation, they would collide causing damage to the equipment. Therefore, we have this lock-out feature that prevents the arm to move if the crane is engaged. The rest of our operations are contained to work cells so if there was a malfunction it would not interfere with the surrounding area.</p>	<p>Elring Klinger</p>
<p>Do you manufacture Hydrogen Fuel Cells and if so, how has the technology changed over the years? And if not, are there particular reasons why you aren't?</p>	<p>Yes. We currently manufacture fuel cells in low volumes for development and for auxiliary applications such as for forklifts. The world of fuel cells is continually being optimized. For the last several years it was mostly relegated to research activities or small production. This has to do with 2 reasons – 1) the cost and availability of hydrogen, and 2) the high cost of the actual fuel cell unit. The availability is being answered by several manufacturers (and the California government is one of the leaders in this area for the US) and the production costs are being reduced as volume starts to pick-up (since you can use automation and high volume production processes rather than hand or semi-automatic presses). During the time the parts have been in development we have seen changes to the bi-polar plate design (typically called out as the “flow field”), the material we use for the plates (carbon and stamped steel), and the coating that is used to prevent corrosion of the plates. All of this was looked at to determine how to make high volume parts and how to ensure the lifetime performance of the components. In addition, the membrane inside the fuel cell has undergone so many research projects around the world that it would be hard to single out one specific advancement. The main thing people are trying to do right now is to reduce the level of platinum that is used in the fuel cells. Although it can be recycled it would still be beneficial to reduce or eliminate this due to costs. In fact, if you are interested, the Department of Energy has a wonderful website where you can see all of the funded developments going on for fuel cells in the US (https://www.energy.gov/eere/fuelcells/hydrogen-</p>	<p>Elring Klinger</p>

	<p>and-fuel-cell-technologies-office). If you look in their database of projects, there was one by GM from last year that talked about low platinum catalysts that is pretty interesting. There was actually a story last week that talked about getting rid of the platinum catalyst and instead using Spinach of all things!!! Pretty awesome stuff.</p>	
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<p>What kind of cells are used for your batteries? Can each cell safely be charged at ~19v?</p>	<p>There are numerous battery types – cylindrical, prismatic, pouch, etc. There is no real standard size for batteries in EVs. Plus, there are numeral types of chemistry when it comes to lithium-ion batteries (NCA, NMC, LTO) depending on your application. The reason for this is that different applications required different capabilities. For example, you could you a battery like what Tesla has in the vehicles (NCA) in a mining vehicle but this would be a bad idea because it has a lot of energy but it is less “safe” in the event of a fire compared to some other options such as LTO (which replaces the graphite in the anode with Li-titanate). Most electric vehicle batteries have no issues with 19V. There are a couple of standards that are used in the industry for charging – 1) level 1 uses 110/120 volts, 2) level is 200/240 volts, 3) if you use DC fast charging you can go to 200/600 volts (and we have developments even going to 800v), 4) tesla is a little different but in general their DC fast charging can be around 480 volts depending on which version of the charger).</p>	<p>Elring Klinger</p>
<p>How much in-depth knowledge of STEM field is required to be a part of the team at Elring Klinger?</p>	<p>Depends on the area you are interested. If you are looking at product engineering or manufacturing, it is pretty much required. In the end, it is beneficial for you as an employee to understand as much as possible in different areas because it helps you to make connections from one discipline to another in order to optimize something and thus makes you more “creative” in your designs.</p>	<p>Elring Klinger</p>

<p>Outside of a four-year college, and internships, what sort of personal projects do employers look for to help an applicant stand out among the rest?</p>	<p>I would not say that there is a specific thing that we look for other than showing an interest in the field you are applying. For example, if you want to be in the automotive industry it would be good to show some interest in cars/vehicles because although it can be fun, you go through tough times at any job so if you don't like your industry it can be difficult to sleep at night worrying about all the deadlines/problems you face. Not to say that you have to LIKE cars ... you could also be completely enamored with the robotics and production processes. Just show that you are interested. One thing I have always felt strongly about is that you can train anyone to do a job, but you have to have some kind of internal drive / motivation which is much more difficult to learn because this helps you learn new things. I have met "smart" people who just have no motivation and bring down an entire group whereas I once worked with a person who started off as a temp and who worked their way up to a division manager because they just loved what they did and was always willing to learn more.</p>	<p>Elring Klinger</p>
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