MONOMERS TO MARKETING
SNAPSHOTs OF CHEMICAL ENGINEERING

WHAT IS CHEMICAL ENGINEERING?
Read about the professionals’ perceptions of what it means to be a chemical engineer

EXPLORING CAREER PATHS
Get glimpses of just a few of the countless possibilities chemical engineers have

ADVICE FOR STUDENTS
Learn what current engineering professionals want students to know

BY KATELYNNE BAUER
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Introduction

Since I was a junior in high school, I knew I wanted to be a chemical engineer. As I have advanced in my education at Michigan Technological University, my perception of what it means to be a chemical engineer has changed quite a bit. The point I realized that I only had a small understanding of the opportunities available to me as a chemical engineer was when I started my internship between my 4th and 5th year of college. The two summers prior had each been part of eight month co-ops working in research and development. That summer, I knew I would be working for UOP, but was not sure what my exact position would be until about three weeks before I started. I found out that I would be working in the marketing department. UOP prides itself in being full of chemical engineers in almost every role. Marketing, Sales, Legal, (pretty much everything but HR) has people who initially pursued Chemical Engineering degrees. As someone explained it to me on my first day, UOP waves a magic wand over chemical engineers to turn them into any role they want. As someone who had been thoroughly convinced that I wanted to stick to engineering, it was an interesting transition in that role, but it reminded me that while UOP is kind of on the extreme end, a lot of chemical engineers (and engineers in general) end up in roles that aren't considered “conventional” engineering roles. As I spoke more with both my peers and professional engineers, I realized that I was not alone in my belief that we as students don’t always have the “big picture” of the opportunities available to us. I do not expect this single publication to provide the full picture. Chemical engineering is such a diverse degree, it would be very difficult to encompass everything that could possibly be said about this incredible career into just a few pages. However, I do hope that by sharing insight into different chemical engineers’ lives, students can start thinking about the other opportunities that await them and be encouraged to explore additional options.
Bios

Sheila Budd
Sheila Budd, a manager in equipment, has had an incredibly diverse career. As an undergrad, she was initially drawn to the medical field, but two people talked to her and convinced her to do engineering. She has had several positions as an engineer including a development engineer, a process engineer, a process control engineer, and a cost estimating engineer. Another technical role she held was that of an engineering design specialist. In terms of management, Budd has been an IT project manager, engineering team lead, training service manager, FOS* manager, engineering training portfolio manager, and business development senior project manager. When describing her career path, she explained, “I’m always open to learning new things.” While some of the job changes were due to company reorganization, others were from her connections within the company and taking advantage of opportunities that arose. Budd said she wouldn’t change anything about her career path despite some of the challenges and positions she didn’t enjoy because all her experiences helped her get where she is.

Jeffery Boike
Jeffrey Boike is director of mergers and acquisitions. He was initially interested in nuclear engineering in a medical context but ultimately decided to pursue chemical engineering. Boike was drawn to refineries because of all the technologies. He started working on the manufacturing end running pilot plants and managing people. Boike then moved on to process engineering. He also did product development with precious metal catalysts. As his career progressed, he moved into more of a business role and decided to go back to school to get his MBA.

*FOS stands for Field Operating Service. These crews travel to work-sites where they monitor the start-up of a project or troubleshoot with existing equipment.
Christopher Gosling

Chris Gosling is a manager in research and development (R&D). He earned both his bachelor’s and master’s before entering the workforce. When asked about what he wanted to do while he was doing his undergraduate studies, he responded, “I wanted to do like we did in plant design where you started with a clean sheet of paper and you design it from scratch and see what you get.” When he entered the workforce, he started as a development engineer in pilot plants. After working in the office for a little, Gosling went on the road* where he wrote data acquisition programs and eventually became the chief technical advisor. When he returned from the road, he held several different roles. Some of these roles were specialist roles. He was also a manager and moved over to the business side. He acted as a senior project manager.

Karl Johnson

Karl Johnson works as an IT project manager. Like many UOP employees, he went on the road; however, he stayed on the road much longer than the average employee. As he was finishing up his time on the road, he held a senior level position at a large grassroots operation. He oversaw 17 engineers and described this role as more administrative than technical. Most of Johnson's tasks were related to project management including scheduling, invoices, revenue, and costs. During his time on the road, there was some time that he was in the office. It was here that he got involved with setting up computer networks, a new concept at the time. This is what sparked his interest in IT.

Johnson started classroom training for project management from SAP and enterprise programs; he even earned a certificate in project management. He moved into a group in the development department called Solutions & Services. He described the purpose of the group as “leveraging [the company's] service capabilities to bring better benefits to [their] customers.” He then moved into Engineering Services & Equipment where he worked with OpAware and Salesforce. Johnson explains that his career has mostly been in service, namely in new developments in IT, which is very different from other engineers at UOP who typically all work in the engineering group at some point in their career.

*Most UOP engineers go on what UOP calls “the road.” The road entails almost all travel while working in FOS.
Jill Meister

Jill Meister is a manager in engineering. She actually started as a biochemistry major but didn’t like biology. Since she but was tutoring others in math and science, people recommended she pursue a degree in engineering instead. Meister fell in love with Michigan Tech’s campus and moved to Houghton. She picked UOP because there was diversification in careers at UOP. She started working in pilot plants where she collected data and wrote instructions. Meister then went on the road. When she returned, she worked in modular systems. As she advanced in her career, she held experience as a project manager, technology manager, senior specialist, and product line manager. These experiences exposed her to creating customer presentations on technologies, writing proposals, drafting agreements, doing customer sales, designing, and estimating costs. Meister explains her career saying, “I need to be challenged, and learn and grow myself.”

David Piasecki

Dave Piasecki’s career includes traditional engineering roles, business functions, and a number of years in the legal department. He has worked in technical sales, R&D, manufacturing, technical services, and customer service. When asked about his undergraduate years, he said, “[t]here was absolutely no thought in my mind at that point that I would want to be an attorney.” However, when a position within the in-house patent group opened up, he entered the legal department and became a patent agent. After some time in that position, he “took the plunge and entered law school at the young age of 46.” He did night school for 3.5 years and worked as a patent attorney before returning to a more business-oriented role.
Christopher Polaniecki

Chris Polaniecki, a strategic marketer, began his career with a 15 month co-op during college. He worked at UOP for 7 years before pursuing his MBA. He started with general training and worked in the rotating equipment group. He then joined FOS. Polaniecki did consulting on-site for technology. He viewed this role as technical services and a way to protect UOP from liability. During his time on the road, he was also assistant advisor to chief advisor and oversaw groups of two to eight people. During his career, Polaniecki has also done sales support, technical support, worked as a business analyst, and was project line manager.

Margaret Stine

Margaret (Peg) Stine has had many years of experience both in engineering and marketing. She is currently Senior Director of Business Transformation. She began her career journey on the road. She did commissioning and troubleshooting for about six years. After the road, she was a process design specialist. In this position she did, as the title implies, process design work. She advanced to a team leader position and then a project manager role. She continued advancing through management in engineering and became a senior leader. In this role, she performed engineering design and got involved with Salesforce. Salesforce is a customer relationship management tool that is used to record, track, and organize data from customer interactions. She also earned her MBA.
Dr. Anne Raich

Dr. Anne Raich is a work process leader in technical services. Early in our interview, Raich described how she decided to pursue chemical engineering. “The day the Challenger exploded, I was in high school and I had been thinking ‘do I want to go into journalism or writing’ (which I was enjoying)... ‘or do I want to be an engineer,’ and when they announced that it had blown up, I wasn’t thinking ‘oh, let’s write stories and interview people.’ I was thinking ‘what went wrong?’ And I realized I had to be an engineer. I was already thinking like an engineer; I just had to learn about it.”

She pursued her bachelor’s in chemical engineering and proceeded to complete both her master’s and doctorate. She explains that the job market wasn’t great when she was about to graduate with her bachelor’s degree, and she enjoyed the research she was doing so continuing her education was a way to continue that research as well.

Her thesis work was related to multivariate statistics. “It’s not because I cared about the statistics. It was because by then I realized a chemical plant has a lot of variables.” She felt that is was crucial that she developed the ability to pick what is important when considering thousands of variables. Her biggest fear after “finishing school (finally) was that [she] would never learn anything again.” While in college and a few years after, she worked as a computer consultant where she “designed, programmed & maintained relational databases and local area network for financial and vital statistics applications.” She entered the workforce just as Six Sigma was getting implemented company-wide. She was responsible for a training program completed by over 3,000 people in three years. She explained that it was an exciting time because it “was all about optimizing a process in a different way.”
HOW WOULD YOU DESCRIBE CHEMICAL ENGINEERING?
When asked how she would describe a chemical engineer, Stine said that they are people who “can do just about everything.” Though not all the engineers agreed with that perspective, many of the professional engineers mentioned what made a degree in chemical engineering so useful. Polaniecki mentioned that this degree is full of “tough academic rigor,” and part of that challenge comes from the diversity of the degree comes from the variety within the degree program. As Meister explains, chemical engineering students “have to touch all these different pieces of other disciplines as well as [their] own.” Gosling adds that this type of engineering is a cross between mechanical engineering, chemistry, and even a little bit of civil engineering. Another engineer emphasized the difference between chemistry and chemical engineering by saying that, “if it’s a tie-breaker, the [chemistry major is] going to lose.” Because of this diverse degree program, chemical engineers also have a wide variety of opportunities both in industries and jobs.
The engineers added several defining characteristics to their descriptions of a chemical engineer. The biggest strength identified was problem-solving capabilities, but generally speaking, each engineer that was interviewed talked about how chemical engineers are practical, analytical and methodical. “We can’t come up with the perfect solution,” Johnson says. “We have to come up with the practical solution.”

When asked why chemical engineers can work in so many different functions, the simplified answer was clear: a degree in chemical engineering not only exposes students to a variety of skills that are widely applicable but it also, and arguably more importantly, trains students to use a highly analytical thought process which provides them with excellent problem-solving skills. Some chemical engineers are even able to use strategies that seem specific to chemical engineering when solving other problems. For example, when talking about financial programs, Raich said, “everything is a system, and it has inputs and outputs. And there’s complicated interrelationships inside that system. You can break it down. You can understand the little pieces, and you can build the whole thing back up.” As Boike pointed out, “engineers look at problems very, very differently than non-engineers.” Even more, chemical engineers are driven by curiosity. This allows them to explore more areas and strive to succeed in them. Budd reminds chemical engineering students, and people in general, that “if you got that curiosity in life, you can go pretty much anywhere.” In addition to the vast applicability of the skills, engineers are systematic in accomplishing tasks. Boike describes the process as “they can plan; the can attack; they can complete, and they can document and move on to the next thing.” This culmination of problem-solving abilities, adaptability, logical thought processes, and methodical work gives chemical engineers a great advantage in the workforce.
Stereotypes

These discussions also brought up stereotypes. Despite these powerful, and sometimes unpleasant, perceptions of chemical engineers, the professionals I interviewed emphatically dispelled some stereotypes or emphasized that the contrary must actually be true and engineers must overcome these challenges to be successful. Four stereotypes came up most often during the interviews.

Engineers are geeks and nerds.
Most engineers agreed that this one wasn’t too far off. Gosling said “We’re all nerds,” but the engineers said this was embraced. “I’m proud to be a nerd,” Budd said. Raich adds, “it is rewarding being surrounded by people who have the same geek qualities.”

Engineers are introverts.
While most of the engineers mentioned this in some form, several mentioned that they defied this stereotype. Polaniecki said that he’s a high extrovert, and Meister called herself a people person. Many engineers also explained that they can’t work alone; there are a lot of interactions with different engineers and departments.

Engineers are poor communicators.
Stine jokes that “maybe that’s not a stereotype; maybe that’s a reality.” Johnson, however, feels that this is one of the worst stereotypes and emphasized that being able to communicate effectively is a crucial skill in engineering.

Engineers only think in black and white.
Boike explains “engineers, by nature, are pretty black and white. We don’t like to think in shades of gray. We don’t like to play politics. We don’t like to hedge, but you have to do that in the corporate world.” Johnson adds that engineers need to be creative and innovative even in troubleshooting roles.
As mentioned before, a chemical engineering degree opens up a lot of opportunities. Budd added that Chemical Engineers have “rewarding, challenging, and well-compensated jobs,” and Boike says “if you want to make things better, if you want to change things, and you’re happy with a nice lifestyle, then engineering is one of the few things you can do with a bachelor’s degree and be compensated well from the start.” However, the discipline of chemical engineering as a whole is ever-evolving. Many of the engineers I spoke with acknowledged that there are a number of changing aspects.

Boike describes what it was like when he graduated as “you went into a chemical company. You went into a paper company. You went into a foods company. You went into a refinery or petrochemical. There were very specific tracks that chemical engineers went to.” Gosling explained that at the time he entered the workforce, the only industries for chemical engineers were timber, chemical or oil. Johnson commented on the increased involvement with biological and medical industries, but it was logical to him because “engineering principles work in the body, too.” Additionally, engineers provide a different (not better) perspective than doctors. Boike said, “[n]ow, they go everywhere.”

Boike believes that chemical engineers are more well-rounded. Piasecki says that with the advance in computing power, the focus of engineering has shifted from number-crunching to applying the results. “So that takes some of the drudgery out,” he says. Polaniecki agrees explaining that the question “so what?” has become much more important than the knowledge itself (though it is still critical), because it is so much more accessible. By asking “so what?,” engineers are challenged to understand the significance, impacts, and applicability of results. Polaniecki adds that because of this emphasis of the so what, “there has to be more of a passion to what is the emotional connection to how that can impact the world.”

Raich believes that the idea of engineering is “more important than ever because we use so many complex chemical products in our daily lives. I mean, from what you wear to what you drive in to what the food you eat comes in and sometimes things in the foods you eat.”
Career Paths
When I started this project, I envisioned career paths with specific steps to achieve similar goals. The diversity in this degree is not just limited to the opportunities; it expands to how these opportunities are taken. Ultimately, even just a few different engineers' career paths create an intricate web of experiences. This section will focus in on how chemical engineers used their skills in some of the different job functions seen in this web.
Overview
It seems intuitive how a chemical engineer can apply their education to a technical role. Boike explains that, to him, refining was so exciting because “it’s like taking the Unit Ops book and doing every one of them.” Gosling lists off the topics he uses regularly: thermodynamics, heat and weight balances, and stoichiometry. He says that as an industrial engineer, a large majority of what they will do is based on that fundamental stoichiometry and balances, but he and several other engineers explained that plant design and unit ops were also very useful. Johnson says that working in the field was what helped take these educational concepts and understand how they actually work.

However, it is much less intuitive to imagine what a chemical engineer would do in these roles and how their experience helps them.

Raich works in technical services where she is responsible for the software that tracks FOS (Field operating Services) crews. She also monitors financials. Her company does a lot of long-term projects with financials that can spread across several years. Raich explains that analysis tools are similar to mass balances because she’s just looking at inputs and outputs. She says that if she could’ve done things differently to prepare for her current role, it would’ve been adapting to the work flow. “I had been doing sprints, and service is a marathon, and it’s an unending marathon. There are always new customers with more problems and more work to do,” she adds. Despite the non-technical focus of these tasks, Raich explains, “I get enough contact with people who are doing the serious technology that I get that engineering need satisfied.”
Dave Piasecki has worked as both a patent agent and patent attorney. He was able to be a patent agent by passing the patent bar. This allowed him to sign his own papers for patents and to write and prosecute patent applications. He went to law school and became a patent attorney. In this new role, he could write contracts, non-disclosure agreements, and joint development agreements.

While most attend school to advance their career, Dave also found that his previous career experience put him at an advantage. He explains that “looking at problems, digesting facts, applying rules, and coming up with a solution in that rigorous thought process was very helpful.” As an engineer, he had developed experience in setting aside meaningless information and clearly organizing his thoughts. He also was used to thinking on his feet and had a business background the other students did not.

Karl Johnson describes his current job as a business administrative role. He interacts with both internal and external customers as he does project management for IT development projects. His goal is to improve efficiency and reduce cycle time. His previous experience is most useful when he needs to step in as a proxy user. His knowledge and experience give him a more specific perspective and allows him to think more like a customer. He cautions that there is continual development in information technology, and everyone must strive to keep up. He says one way he does this is by adapting what he does at home.

Chris Polaniecki works in the strategic marketing group. He says that over half of his day is planned the day before, and he doesn’t have to do a lot of “fire-fighting.” A lot of his job involves collecting and gathering information. The challenge of Polaniecki’s job is so much of it is collaborative and he has to find ways to work with a group despite them not reporting to him. He says that while he is more of a business person, he leverages his chemical engineering education and experiences.

There is actually a strong connection between marketing, especially in a technology company. Gosling says that “to be really effective in a marketing role you gotta understand basic engineering.” Several other engineers said that marketing helps develop the bigger picture. Stine says that marketing is understanding why we do things while engineering is focused more on the what. Polaniecki explains that chemical engineers speak in terms of mass and energy balances, but to understand where the value comes from, you need to speak in dollars. Marketing allows him to do this.
Sheila Budd is the global equipment operations support manager. In this role, she manages and coaches people while removing roadblocks. She enjoys training and summarized her job as “bringing out the best in people.” Chris Gosling is a director in R&D. He says that a lot of his job is meetings. These meetings are for project updates, check-ins with the VP of R&D and assisting with troubleshooting. Jill Meister’s average day as a manager in engineering may have a variety of responsibilities. She reviews e-mails for “fires” she needed to address. She performs cost estimates, writes proposals, and has calls with Delhi to discuss staffing, project statuses and resource sharing. She also has a lot of meetings and reports to several senior managers. Meister explains that while her job is more about managing people and resources, she still has technical discussions. Peg Stine’s job at the time of the interview was a director in marketing. This job involved “managing UOP’s digital customer interface.” She tried to figure out the return on investment for different “communication vehicles.” She also did budget work, kept web content fresh, monitored leads, routed answers to customers, and participated in a lot of teleconferences to communicate with other people interacting with the global company.

Dave Piasecki summarized his job as a technology manager (an expert for a specific technology) as answering questions for people. Now, as a process manager, he explains that his job varies based on what projects are going on. Between six and twelve hours a week of meetings, reviewing emails, and communicating with people in business, engineering, R&D, and sales report, Piasecki runs computer simulations and performs data analysis. He says that one of his challenges in this role is that he has no direct reports. “I have to facilitate things without actually telling people what they have to do,” he says.

Though their jobs may have shifted to a different focus, they still find ways that their engineering experience is relevant. As a manager in R&D, it is critical that Gosling maintains his chemical engineering knowledge, namely in regards to kinetics and catalysis. Meister says that her technical background helps her troubleshoot, provide suggestions, and be more effective at managing resources. Stine explains that even just going through engineering school taught her “if you work hard at something, you’ll figure it out.”

As managers, people skills are crucial. Gosling explains that these aren’t really something that can be learned. “You can take classes and stuff, but it’s not the same. People are all different and how do you handle different personality types and that kind of thing,” he says. “You just have to do it...definitely a lot of different personality types you have to prepare for.” Stine adds that managing people is a personality thing that not everyone is cut out for, but she has taken advantage of training classes, reading, and learning from her managers. Budd says that her experience with different managers in all her roles helped her to see what was and was not effective as a manager and on teams. She says that she’s experienced some “anti-mentors” in her time, but that has only helped her be a better manager.
The engineers were asked about the most rewarding and most challenging aspects of their careers. This section shares their responses.
What has been the most rewarding aspect of your career?

“Immense amounts of world travel...that’s really opened my eyes not only on a professional level to the world but at a personal level as well.” - Chris Polaniecki (estimates between 20-25 countries visited)

Making a difference” - Chris Gosling

variety of opportunities

skills learned
“Switching my jobs like this has definitely made it easier to accept the new. To be out of my comfort zone.”
-Sheila Budd

“There’s a lot of smart people. And you can get humbled constantly, but in the right sort of way.”
-Jeff Boike

“Helping people that were in pretty dire situations personally and were about to ruin their careers and stepping in and getting them the help and seeing them be so successful afterwards, that’s been the most rewarding part of my career”
-Peg Stine

“Success with executing my job and my career path in terms of my career growth”
-Chris Polaniecki
“Work-life balance”—Anne Raich

Sheila Budd mentioned her brief time as an FOS manager. It was a 24/7 job and that was a very challenging time for her.

What has been the most challenging aspect of your career?

Dave Piasecki mentioned the large amounts of international travel. At one point, his two-year-old son didn’t know who he was.

“making the decision to commit to getting my MBA”—Chris Polaniecki
“I might not have known what I didn’t know.” - Jill Meister

“The [economic] busts are painful. The consolation is I know my colleagues who have lost their jobs have great skills. I know those skills are generally applicable and they can find employment elsewhere.” - Anne Raich (describing busts in oil market)

“Managing people...The guy...was a marine in World War II and he worked in Border Patrol...He heard I was getting into management. He said ‘that’s the toughest job you’ll ever do,’ and he’s right. This guy has been a soldier, on the border in Arizona for 8 or 9 years. His patrol was like two hundred miles of border by himself. He’d done all kinds of tough stuff. And he’s right. It’s the toughest thing you have to do.” - Chris Gosling

Challenges are inevitable within any career, but Sheila Budd shared a quote that is meaningful to her

“when you lose, don’t lose the lesson.”
Women in STEM

I came to each interview with a list of ten questions, and none of those questions asked about being a women in engineering. However, being female in a STEM role is something that presented some challenges in their careers.

When Meister was asked what the most challenging aspect of her career was, she responded “honestly, being a women.” She explained that there were very few women on the road. In one country, she had to walk down and across the street to access a bathroom. In Korea, she explained, “they would follow me around the operations...They would literally follow me around.” She jokes that she would walk to the top of a piece of equipment and pretend to take a measurement just to get them to stop.

Stine said that she spent time as a project manager. Communications were done over fax, and she signed off as M.A. Stine. At the first face-to-face meeting, the customers were shocked to discover that she is a woman. She said that on the first day, during a meeting, all the questions were directed to the specialist (who was male), and she would answer them. On the second day, she found that more questions were being directed to her, but there were still questions being directed to the specialist. Finally, on the third day, they directed all the questions to her because she had earned their respect.

Raich shared her experience as a senior in her undergrad. “I knew the man who ran the [unit operations] lab was an old timer who wasn’t sure girls should like read, let alone be engineers. So I made it a point of wearing pink every day to his lab.” While she did not face outright prejudice like that once she entered the workforce with her doctorate, she shared a microaggression she experienced. “I am a pretty good typist...one gentleman who was about to retire said ‘wow, you’re a great typist. You could be a secretary.’” Though this was many many years ago, there is still an imbalance between men and women in the STEM field. “You know large meetings and you know 50 engineers, and I was the only female,” Raich comments. “You have to be ready for that. It’s going to happen. If you’re intimidated by standing out, you’re going to have a hard time in this field.” However, there is an increase of women in engineering. Budd feels that the diversity women provide is critical. She believes that women “tend to be more inclusive” and “look out for the greater good.” Raich adds that retention is less of a concern than it used to be because the company is taking stride for more flexibility with work to address family situations which helps men, too.

Despite the challenges women in STEM have faced and may experience, though at a lesser extent than in the past, Stine summarizes it best when she says “I’m not going to let my being a women affect the way I do my job or affect the way others will let me do my job.”
WHAT ADVICE DO THESE ENGINEERS HAVE FOR STUDENTS?
One of the topics that Johnson really emphasized was mentorship. “Finding and developing a relationship with a mentor is really important” both in life and business, he explained. He said that a mentor should be able to “impart knowledge that’s specific to your job,” but more importantly, they should be able to help you with your career goals. This is why Johnson advises against a direct supervisor. “Sometimes your career goals and his business goals don’t align,” he said. You need to be able to be candid with your mentor (or mentors) without fear of repercussions for your current job. He said mentoring can evolve in a number of ways, but one way to do it is to take on special projects. Johnson describes a scenario with someone in management talking. “I’ve got this horrible thing. I don’t have time to fix it, and I need you to do all this grunt work.’ And they want it in two weeks. And you don’t say ‘gee, that’s too much work,” or ‘I’m busy.’ You say ‘That sounds great! What do you want me to do? When can I get started?’”
Ten tips professional engineers want students to know

1. Follow through with this degree if it is what you’re passionate about

Raich did include this warning: “Be sure you want to be a chemical engineer. If you do not love math and science… think about something else, because that’s what the career is.” Budd, however, when asked to share advice, enthusiastically and without hesitation said “stay in chemical engineering!”
Develop a strong technical background early in your career

Polaniecki posed these questions: “do I really want to jump into more of a business role right away...or do I want to continue to enhance my ability in terms of more design, more in terms of process, more in terms of execution of chemical engineering academic principles?” Both Stine and Gosling agree, however, that you will be better off with a strong technical background. Gosling advises “get a good, solid, technical base before you do anything else, and do well at your job. Any career path that you get, as long as you stay in the chemical industry, is going to be based on what you can do technically.”

Take chances

Piasecki advises “keep your skills diversified to enhance your opportunities.” Boike says that “the more holistic, the more broader your background and education is, ...the more opportunities for you.” He also believes there will be less strictly technical roles in the future so having a diverse set of skills becomes even more important. Johnson even advises attending conferences that aren’t part of the industry you’re working in. Sometimes, other industries may be solving a problem in such a way that it could be applicable to a problem you have. “Having a really fixed image of exactly what you’re going to do, I don’t think works in anyone’s life, but in chemical engineering, to me, the whole point is advancement and designing new ways so you have to be open to that yourself,” Raich says. “If you don’t have an attitude of ‘I want to explore,’ it's gonna be a sad career.” If part of that skill diversification includes higher education, Boike advises that the student do it “sooner rather than later (it’s easier)” and to “go with the best graduate program” a student can get into.

“Don’t wear the conservative engineer hat if you don’t have to, “ Boike says. He encourages young chemical engineers to take risk, especially early on in their career. Piasecki agrees saying, “don’t be afraid to take a reasonable risk and chances.”
Embrace change

Part of taking risks is embracing change. Johnson cautions that resisting change hurts you, the company, and the customer.

"Let yourself be seen and heard," Budd advises. Meister encourages engineers to "let people know that you are interested and want to improve."

You have to accommodate change. You have to participate in change. You have to champion change.

Meister also advises that engineers set clear, measurable goals for their position and pay attention to any job reviews they have so they can improve.

Know yourself

Boike recommended knowing your personality and the culture of the company. Knowing both of these can help you advance the positives and look at potential areas where you can modify your behavior. To a certain extent, you can adapt, but going into a company culture that clashes horribly with your personality will cause problems. "Figure out what you like to do," Meister advises. Figure out what you don't like to do but you'll put up with, and then figure out the stuff that is just not a good fit.

Using this knowledge of your personality and leveraging your skills will help you find a job that is a good fit for you.
Improve your communication skills

“I know they’re a pain in the butt, and I know it stinks, but it’s really, really, really important,” Meister says. "Your written communication, your reports, and how you present them and put it together as a team...is really important.”

Work on people skills

Boike encourages the use of personality profiles for teams even though some may think that they’re “anti-engineer.” Using this knowledge, especially in a team setting, will allow for better interactions. As Meister said, “understanding how people think is worthwhile.”

Have fun

I can not put it better than Boike when he said, “You need to have some fun in your job and you need to feel like you’re making a difference.”
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