



**Natalie Zaczek McIntosh,
Fuels Reliability Engineer**

ANS CAREER PROFILES

Mechanical Engineer

Who are they?

Mechanical engineers are women and men who design and oversee the manufacturing of many products ranging from medical devices to components that power a ship or spacecraft. They provide day-to-day technical and practical engineering advice, problem solving, and support to operations and maintenance departments.

What do they do?

Mechanical engineers can work in nearly every area of science and technology. In nuclear science, they research the benefits of nuclear energy and radiation to develop systems and processes. They provide input for safe operations of nuclear facilities and make improvements for nuclear plant operation. They are on the forefront of developing exciting innovations in medicine, agriculture, space travel, flight, and robotics.

In nuclear sciences, they use their experience and background with mechanical and thermal sensors to develop nuclear equipment and systems. This may include reactor cores, radiation shielding, and designing safe shutdown scenarios. Mechanical engineers apply thermodynamics (the relationship between heat, work, temperature, and energy) to transform thermal energy into electrical energy. Mechanical engineers work at nuclear power plants, energy companies, and some even work in the military!

How do I become one?

Mechanical engineers typically need a bachelor's degree in mechanical engineering. Courses include math, science, engineering, and design. Fields of study, like engineering, encourage strong skills in math, problem-solving, and communication. Mechanical engineers in nuclear focus on thermodynamics, heat transfer, and materials.

Spotlight on a real Mechanical Engineer!

Natalie Zaczek McIntosh is a Fuels Reliability Engineer at Exelon. She has more than 10 years of experience in different aspects of nuclear energy.

McIntosh has been responsible for maintaining the safe, reliable operation of many nuclear power plants. This includes making changes to the design of power plants over time to improve operations and incorporate new technologies. McIntosh's background in environmental engineering led her to a career in nuclear science.

She was interested in maximizing the benefits of nuclear as a safe, carbon-free energy source.

A word of advice: The Society of Women Engineers can help connect high school students to college visits and professionals in the field. She also recommends getting involved with the American Nuclear Society Young Members group in college.

Let's Chat with Mrs. McIntosh!

Tell us about the most exciting project that you worked on.

Being part of a high-functioning team for a project from start to finish was the most rewarding. We installed new efficient turbines as part of a power uprate for one nuclear plant. A power uprate is where we improved the design to get more electrical power out of the same site. This was exciting because I followed the design, the installation, and ultimately witnessed the startup testing. This plant was in another state, so I got to travel and meet new people.

What skills are required in your position on a day-to-day basis? Do you use skills that you learned before college?

Having a strong technical basis is required including critical thinking skills, but another essential skill is communication. An operating power plant requires working with many other people in different departments and thus different perspectives. This is a skill that can be developed over time and maybe isn't the easiest for an engineer. But being able to communicate issues is valuable. I use many of the social skills learned from being on sports teams and working in groups at school at my job every day!

What do you do in your spare time?

I have a young toddler, so I enjoy spending time with my family and watching my son learn about the world. I am the Chair of the American Nuclear Society (ANS) Chicago Local Section and am a member of the local Women in Nuclear (WIN) chapter and the NAYGN (North American Young Generation in Nuclear). As a lifetime Girl Scout, I enjoy giving back to that organization. I lead a 'Get to Know Nuclear' patch session for Girl Scouts every year and I volunteer at the Girl Scouts' STEMAPALOOZA. STEMAPALOOZA is a STEM

expo that provides hands-on activities to inspire girls to pursue STEM subjects and careers. I also enjoy board game nights with my friends, coworkers, and family.

What educational preparation would you recommend for someone who wants to enter this field?

A bachelor's degree in engineering opens the door to a wide variety of career options anywhere, including at the nuclear power plant and is a minimum requirement for engineering fields. Note that this does not need to be specifically a nuclear engineering degree to be part of the industry. I have a mechanical engineering degree, so don't worry too much if you're uncertain about which type of engineering degree to pursue.

Is there anything else we should know about this career path? Anything unexpected?

A career in nuclear engineering can go in many different directions, based on your interests. You can be a technical nuclear engineer or move into operations or another department or develop into management. What I enjoy about my career is that every 3–4 years I move into a new role which improves my overall understanding and keeps things interesting because I get to learn new things.