Jacquelyn K. Nagel

Jacquelyn K. Nagel is currently an Assistant Professor of the School of Engineering at James Madison University (JMU). Prior to JMU she worked as engineering contractor at Mission Critical Technologies working on the DARPA funded Meta-II Project.

Jacquelyn has gained seven years of diversified engineering design experience, both in academia and industry, that spans a range of contexts, including: model-based design, new product design, bio-inspired design, electrical and control system design, manufacturing system design and design for the factory floor.

She has worked at Kimberly-Clark, Motoman, and Intel and gained cooperative education experience in the areas of industrial automation and manufacturing. During her doctoral work she designed bio-inspired sensors that perform “up front” processing which vastly reduces data streams and increases efficiency, as well as developed computational design tools and methods to make biological inspiration accessible to engineering design problems.

During her master’s work she developed a method for the design, integration and control of modular rapid manufacturing systems. Her current research efforts are focused upon modeling and analysis of bio-inspired sensors and investigation of how biological inspiration can influence complex system design. Jacquelyn obtained her Ph.D. in Mechanical Engineering from Oregon State University researching bio-inspired design with application to sensor design. She earned her M.S. and B.S. in Manufacturing Engineering and Electrical Engineering, respectively, from Missouri University of Science & Technology (formerly University of Missouri-Rolla).

Why did you choose to study the engineering field?

I love to solve puzzles, and I have a strong curiosity to figure things out or how something works. When I was told that engineers solve problems, I knew it was the right career for me and never looked back.

What do you love about engineering?

That engineering impacts society in so many ways. Engineers improve quality of life and keep us, as a people, moving forward.

What don’t you like about engineering?

The inaccurate stereotypes about engineering. Students that are good in math and science are often told "You would make a good engineer." There is so much more to engineering than solving math and science problems! Such as applying those math and science concepts to obtain one of many possible solutions, designing a product, making trade-offs, interacting with clients, working on teams, building prototypes, and developing an intuition for problem solving. Yes, a good foundation in math and science is needed as well as a penchant for those subjects, but many other characteristics and skills are needed.

Characteristics and skills that are of equal importance are creativity, tenacity, understanding the "Big Picture" as well as the details, the ability to make connections among the sub-disciplines of engineering and potentially other domains, problem solving skills, communication skills, and project management skills.

Whom do you admire?

I admire all the pioneering women in the science, technology, engineering, and mathematics fields because they demonstrate dedication and passion! These women do not let society dictate what they do, rather they blaze their own trails and serve as role models. I admire George Washington because he was a great leader and had a genuine concern for the people of his country. He accepted the challenge to become the first U.S. president, an unknown role. He also was not afraid to "get his hands dirty" with low-level tasks. I admire Jack Kilby because of his ability to pull from different disciplines when solving a problem. He designed a solution to circuit manufacturing, which resulted in the first integrated circuit, that combined electrical engineering, manufacturing and design.

How has the engineering field changed since you started?

Two changes come to mind: 1) the increased number of pre-university programs to introduce engineering to young people; and 2) the increased diversity of engineering professionals in ethnicity, age, perspective, and motivation.

What direction do you think that the engineering field is headed in the next 10 years?

The problems engineers will be faced with in 10 years will be more complex, and require a multidisciplinary skill set. To meet that need, I think engineering education will become broader, but integrated, to create the engineer that can handle complex, multidisciplinary problems.

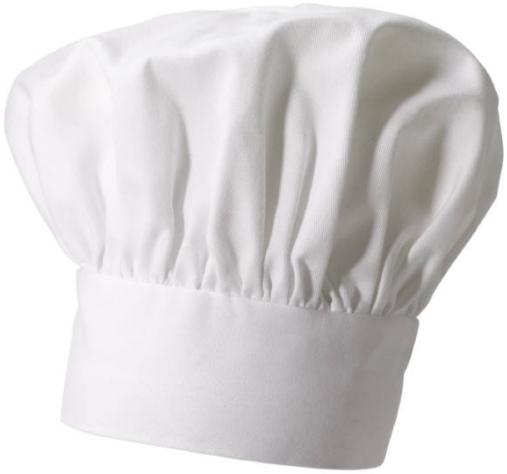
What is the most important thing you have learned in the field?

Engineering work is rarely confined to a specific discipline. Having an open mind and willingness to learn new things or perform tasks outside your specific training (i.e., electrical engineering) will greatly help you in your career and build respect amongst your colleagues.

What advice would you give to recent graduates entering the field?

Learn from your mistakes. Do not be afraid to ask for help and learn from your colleagues - no one has all the answers. Take on tasks outside of your comfort zone or expertise area - they will broaden your perspective and experience, which will make you a more versatile and effective problem solver.

If you were not in the engineering field, what would you be doing?



I entertained being an artist or a chef, which appeals to my creative side. But my practical and methodical side, which is dominate, would have probably taken me into physics as I have a strong curiosity about our world. As I began researching biology for my doctoral work, I realized how much I like learning biology and about how things in nature work. I would put biologist at the top of the list.

Finish this sentence: "If I had more time, I would…

…take kickboxing and aerobics classes regularly."