



Sloan Career Cornerstone Center

Profiles of Nuclear Engineers



Dwight L. Williams, Ph.D., P.E.

Chief Engineer/Principal Nuclear Physicist

**U.S. Department of Defense (DoD),
Technical Applications Division**

Education:

- ▶ Ph.D., University of Maryland
- ▶ B.S. and M.S., North Carolina State University

Job Description:

As Chief Engineer, Dwight oversees all nuclear, geophysical, biological, chemical, and electrical engineering activities within the DoD's Technical Applications Division. As Principal Nuclear Physicist, he works within a team of scientists and engineers that devise nuclear tools for DoD use.

Comments:

As a nuclear engineer who works for the Pentagon, I am able to work with the smartest engineers and scientists in the country -- possibly in the world -- solving some of the most difficult analytical and technical problems our government has ever faced. I find this to be extremely rewarding.

Advice to Students:

Enjoy your college experience, but stay focused. You went to school to earn a degree in a field that you may be working for the rest of your entire life. Take the time to learn your field well -- but realize that even if you don't learn it perfectly, you will continue to learn while you're working professionally, and you can still make a difference.

▶ INTERVIEW SEGMENTS

- ▶ **Q:** When did you know you wanted to become a Nuclear Engineer?
- ▶ **Williams:** Well, although I have always enjoyed science, I didn't seem to perform especially well in my in high school science classes . . . until I took physics. Physics seemed to come naturally to me, and I earned my first "A" in a high school science course. I found Einstein's theories to be especially interesting. So, because I liked science, I did well in physics, and I seemed to be drawn to Einstein's work, I decided to pursue nuclear engineering.

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Source: American Nuclear Society

▶ Q: What was your college experience like?

▶ Williams: I had a great college experience. N.C. State thoroughly prepared me technically as well as in other areas. The nuclear engineering curriculum was challenging, but not impossible. It was also broad enough to explain how nuclear engineering fit contextually within the broader scientific and engineering fields. Besides technical development, my friends and years as a college athlete enabled me to develop socially. My involvement in campus Christian activities helped me to develop as a whole person.

▶ Q: Did you co-op while you were an undergrad?

▶ Williams: No. I was a college athlete and I was also trying to graduate in four years, so I opted not to take advantage of co-op opportunities.

▶ Q: How did you get your first job?

▶ Williams: Towards the end of my Masters Degree research, I began working for the U.S. Department of Energy (DOE). The employment opportunity was made available to me because of the DOE Graduate Fellowship that I won towards the beginning of my graduate studies.

▶ Q: What's the most rewarding thing about being a Nuclear Engineer?

▶ Williams: As a nuclear engineer who works for the Pentagon, I am able to work with the smartest engineers and scientists in the country -- possibly in the world -- solving some of the most difficult analytical and technical problems our government has ever faced. I find this to be extremely rewarding. It is humbling to play a significant role within such a talented team.

▶ Q: Do you spend a fair amount of time traveling?

▶ Williams: Yes, I have traveled extensively within the U.S. and internationally. Most of my travels have involved meeting with scientists and engineers to solve technical problems, touring facilities to learn about problem solving resources that are available (computing facilities, laboratories, etc.), and presenting my analysis and research once problems have been solved.

▶ Q: Do you have a mentor? Or did you in your college years?

▶ Williams: Yes, I have several mentors. Each one has played a pivotal role in my success. Technically, my mentors are Dr. DeGangi (a Pentagon Nuclear Engineer) and Dr. Brangan (a Department of Energy National Laboratory Nuclear Engineer). Academically, my principal mentors were Dr. Abraham with the Southern Regional Education Board for my Ph.D. studies and Dr. Hankins with N.C. State University for my B.S. and M.S. studies. Finally, for personal issues, my mentor has been Mr. Mazyck. All of these men have made personal investments in me and have used their life experiences to instruct me. In a very practical sense, the mentorship that I have received over the years has made me the person that I am today.

▶ Q: Do you find yourself working more in a team situation, or more alone?

▶ Williams: I have worked within teams pretty consistently throughout my career. I enjoy working within teams because it offers me lots of exposure to how others perceive and process information, how other scientific and engineering fields fit into the overall solution, etc. As I have progressed in my field, I have found that my role within my various teams has changed. As a mid level engineer/scientist, I was more of a "hands on" problem solver -- a complicated,

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but reasonably well-defined problem was given to me, and it was my job to solve the problem. I was able to join with other scientists, engineers, and analysts to make sure that the job was completed quickly and accurately. Now that I play a senior level role, I find that my job is principally defining the problem, determining the optimum personnel and resources needed to attack the problem, and breaking out manageable portions for various teams to complete, based upon their expertise and experience.

▶ Q: Do you find you are able to balance work with social/family life while working in your current job?

▶ Williams: It can be really tough. In my case, my family, mentors, and friends have been really encouraging and supportive. It has definitely been a team effort.

▶ Q: If you had to do it all over again, would you still become a Nuclear Engineer?

▶ Williams: Definitely. I can imagine that there are some who are interested in nuclear engineering, but unwilling to try the field because they think that it is "too hard". Although the field is challenging and some aspects can be really complex, I don't think that its "too hard". If you are considering nuclear engineering, then I encourage you to try it out. I bet that you will rise to the occasion, just like I did -- you just may surprise yourself!

▶ Q: Did you think that school prepared you for the way the work gets done in the real world?

▶ Williams: It prepared me enough. Without real world professional experiences (internships, co-ops, etc.) it can be difficult to appreciate how fast (and slow in some cases) things happen in the real world. School helped me to be the best me that I can be -- technically, socially, and personally. With the foundation that I developed in school, I have been pretty successful in navigating my way to a place of satisfaction.

▶ Q: Where do you see jobs for Nuclear Engineers in the future? What should students be doing to prepare themselves to take on those roles?

▶ Williams: I expect that jobs for nuclear engineers will be going through the roof in a matter of years -- in quantity, complexity, and excitement. After the Three Mile Island incident, the nuclear field took a serious downturn. This downturn was compounded with the fall of the Soviet Union. However, there is clear evidence of the resurgence of the field in all sectors -- academic, private, and government. This resurgence is already evident for those of us actively involved in the field. It should be clearer to others in a matter of years.

Students should begin to prepare to take advantage of the opportunities associated with the resurgence. Of course, I am most familiar with the traditional path -- obtaining a sound mathematics and calculus-based science background in high school, majoring in nuclear engineering or nuclear physics in college, and continuing for graduate school pursuits. However, there are other ways to play a significant part in the nuclear renaissance. For example, those pursuing or interested in medicine might consider the nuclear medicine field to discover new ways to treat cancer patients. Those that are interested in space travel could consider nuclear propulsion. There are many ways that students can plan to play a role, independent of their primary scientific or engineering interest.

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▶ Q: What other advice do you have for students?

▶ Williams: Enjoy your college experience, but stay focused. You went to school to earn a degree in a field that you may be working for the rest of your entire life. Take the time to learn your field well -- but realize that even if you don't learn it perfectly, you will continue to learn while you're working professionally, and you can still make a difference.

Also, once you start working, appreciate the role you play in the team and the role others play. There's no point in considering everyone a competitor. Of course, at some point, you may find yourself being compared with your peers for promotions, bonuses, etc., but as long as you complete your tasks on time, thoroughly, and accurately, you should be in good shape. I have found that considering everyone to be a team member -- being willing to give help to or receive help from just about anyone -- has worked really well for me. There are some people that have tried to use my teaming efforts for their personal benefit and my demise, but all in all, I have ended up o.k. I have progressed through the ranks faster than I would have ever imagined, and I have been able to enjoy the ride.

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