

The background of the entire page is a photograph of a long, straight asphalt road stretching into the distance under a bright blue sky with scattered clouds. A bright sun is visible in the upper left corner, creating a lens flare. A semi-transparent blue wireframe grid is overlaid on the entire image, resembling a molecular or crystal structure.

YOUR CAREER PATH

DISCOVERING CAREERS IN MATERIALS SCIENCE & ENGINEERING

A RESOURCE FOR STUDENTS, GUIDANCE COUNSELORS, AND TEACHERS

Provided by ASM INTERNATIONAL



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ASM International World Headquarters | Materials Park

WHO IS ASM INTERNATIONAL?

ASM International is a professional association, an organization that seeks to further the materials science and engineering profession. ASM produces authoritative and peer reviewed content, organizes technical exhibitions and conferences, provides expert-led education and training, and gives our membership a forum for networking and professional growth. We have over 20,000 members, 88 local professional chapters, and 100 university-based student chapters. With dozens of national and hundreds of local volunteer committees and a robust awards program, ASM serves as a place for our members to give back and invest in the future of the profession.

Our membership is diverse and global, reflecting a wide variety of different career roles and paths. From entrepreneurs and welders to professors and their students, ASM seeks to support and represent the entire materials industry. To see ASM programs that may be of interest to you, check out [page 27](#).

For more information on ASM, please visit asminternational.org.

PURPOSE OF THIS BOOK

Despite the heavy promotion of math and science based careers, many schools do not have dedicated materials science and engineering classes. This gap has led to many students not realizing the exciting career choices available in this industry until freshman or sophomore year in college. Even then, students may not know the full possibilities of a materials science career. This book, comprised of 20 career profiles, will help inform you of some of the opportunities that you can pursue in materials science and engineering for a rewarding career.



HELPFUL DEFINITIONS

Throughout this book, you may encounter terms that are unfamiliar to you. In all cases, we encourage you to ask your science teacher and/or research it online. To help get you started, we provided some basic definitions below:

FASM – Fellow of ASM International. This is a prestigious designation awarded by ASM International to members for their distinguished contributions to materials science and engineering.

PE – Professional Engineer. A designation that shows an individual has met certain criteria and is qualified to protect/serve the public in engineering matters.

BS / BA – Bachelor of Science and Bachelor of Arts. Both are typically earned after four years of study as an undergraduate at a college or university.

Metallography – The science of revealing and examining the structure of metals.

Acoustic Materials – Materials that can be used to reduce or modify sound.

Turbine – A rotary electro-mechanical device used to generate power such as used in a wind mill. Can be driven by water, wind, steam, or gas.

Sintering – The process by which materials are brought together into a solid or porous mass by heating and possibly compressing it below the melting point.

Ferrous Metals – A metal that contains mostly iron.

Superalloy – An alloy (combination of metals and elements) that is considered high performance (i.e. resistant to corrosion, high strength, etc.)

Residual Stress – Stresses that are left in a material after the original cause has been removed.

Oxidation – A process that occurs when a material gives away electrons to form oxides. An example is iron forming rust when it reacts with oxygen.

Peening – The process of working a metal's surface to improve its properties. Peening is often done through the cold work process of hammer blows or blasting with metal shot.



Photo Submitted by: Chris Marvel



Photo Submitted by: Beth Snipes

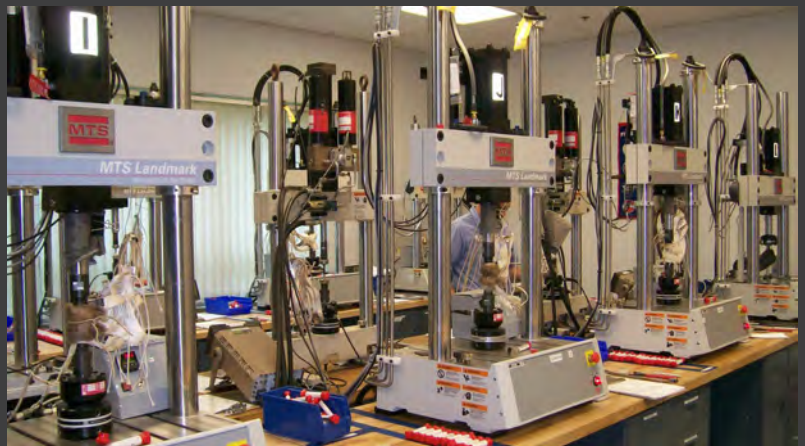


Photo Submitted by: John Tartaglia



Photo Submitted by: Nicholas Cherolis

WHAT IS MATERIALS SCIENCE AND ENGINEERING?

Materials Science and Engineering (MS&E), simply put, is the study and application of materials to our everyday lives and for the advancement of humanity through development of new materials. This definition on the surface is sterile and boring, so let's explore the dynamic side of MS&E.

MS&E has played a pivotal role in improving and preserving our lives since prehistoric times – think about the development of the wheel, tools, and even weapons. As we evolved from hunters who wielded knives and spears to an agrarian culture which required plows, shovels, hoes, and picks, advancement in tools made from materials advanced civilization. Materials played a critical part in the Industrial Age as we learned to adapt existing materials into new forms and functions. In the Atomic Age, we learned how to harness the power of the atom, which required a new understanding of materials and their interaction with unstable atoms. In the Space Age, the search for fuels that would allow us to escape gravity and the materials that would keep us safe in an alien atmosphere promoted materials research and understanding. Work in a zero-gravity atmosphere opened doors for using materials in unique applications. Now in the Technology Age, materials research and applications have resulted in high-tech homes and a generation of technology addicts. If history is any indication, MS&E will be at the forefront of advances into a future world.

Those of you considering your future might wonder about opportunities that MS&E offers. We used to say that the sky was the limit, but we're way beyond just the sky. The Mars rovers have opened new worlds, or at least have helped us to understand other planets in our universe. For those of you that prefer terrestrial challenges, there are endless opportunities on top of the earth and below its surface. For those that wish to go really deep, we have the oceans.

I'll admit to being biased, but I can't think of any aspect of life that is not touched by MS&E. Materials challenges and opportunities abound in our world. Do you like mysteries? Do puzzles intrigue you? Do you want to make some fantastic discovery that will put you in consideration for a Nobel Peace Prize? Are you an explorer? Do you find CSI captivating? Do you enjoy playing? MS&E has the perfect place for you!

Industries that use MS&E abound. You can find a materials scientist/engineer involved in everything from A to Z. Agriculture and aerospace have MS&E in common. If you're of the rural persuasion, advances in tractors and agricultural equipment are astounding. You can now sit in your computerized cab/office and let GPS and John Deere tend your fields. If you're more otherworldly, you realize that without materials research, space related necessities — rockets, their propulsion, space suits, and re-entry ceramic insulation — would not be possible.

And what about "Z"? Zinc, zirconium and zithers are opportunities for the aspiring materials scientist/engineer. Finding, mining, and refining elements for use in innovative products are all aspects of MS&E. If you're a musician, you can appreciate the advances of materials in the vast improvements in your woodwind, brass, and stringed instruments.

Between A and Z, materials flourish. Think about the medical industry. Diagnostic equipment, and even super fine needles, are the results of advances in MS&E. The six-million dollar man (or woman) would not exist without bio-materials. Drug delivery systems, replacement heart valves, and corrective lenses all have materials in common.

If you're into "who done it" mysteries, failure analysis may be the perfect match for you. MS&E opens a new world for forensics – both criminal and mundane. For example, whenever a plane crash occurs, a group of materials scientists/engineers descend on the scene. Armed with a knowledge of materials and how they fail, materials scientists/engineers can reconstruct the crash scene and pinpoint the origin of a failure. How cool is this for detective work?

The energy world would not exist without MS&E. Locating, extracting, and refining fuels have been improved by knowledge of materials. Wind turbines, solar cells, and geothermal energy are examples of alternate energies made possible by understanding, developing and implementing new materials technology.



Consider the ancient art of blacksmithing. Blacksmiths had to know their metallurgy to make implements that would serve a purpose and last. The advances in this art form make it relevant today. Farriers (horse shoers) still use mild steels to protect horses' feet. The racing industry needed something better, and the substitution of titanium resulted in a strong, protective structure that was much lighter.

Hopefully, these few, varied examples of the exciting world of materials will help you consider MS&E. What makes your heart beat faster? What gives you a sense of accomplishment? What motivates you to reach higher? If you dig a bit deeper, you'll find that there is a place for you in the world of MS&E. Get ready for an inspired life with just the right amount of challenges.

Written by:

Beth Snipes, FASM | Senior Materials Engineer | Technology for Energy Corp.

Be sure to check out Beth's career profile on [page 13](#).

ELAINE MOTYKA

Principal Materials Engineer | Technetics Group

Education & Certifications:

BS in Mechanical Engineering, Worcester Polytechnic Institute

MS in Materials Engineering, Rensselaer Polytechnic Institute



ASM Past and Current Volunteerism Snapshot

ASM/TSS Accepted Practices Committee (Member)

What are the responsibilities and tasks of your job?

My role is primarily to manage research and development (R&D) projects related to materials-process interactions to create new or improved products by testing and validating new materials or processes. In this role, I also introduce my company and colleagues to new materials or modified properties, act as the innovation champion, aid in troubleshooting design/manufacturing issues related to materials, recommend strategies for market development, and work closely with customers. Our products are primarily metallic seals and acoustic materials for aggressive environments in aerospace applications. While working in this area, I have developed an improved abradable seal material for turbine engines and have a patent pending on this technology.

What is a typical day at work?

Daily, I get to play with superalloys and other high-temperature materials in various forms, such as wire, powder, sheet, etc. I get to modify and optimize the structure and properties of these materials using processes such as sintering, coatings, diffusion, infiltration, and additive manufacturing (and others). Phase transformation and composite structures are a big part of my day. I plan statistically designed experiments and work with colleagues to access production resources to get the experiments done. I am hands-on, making my own prototype materials, operating furnaces, testing the samples, preparing the samples in the metlab, and performing metallurgical analysis including electron microscopy. I write reports, plan and carry out project tasks, issue technical presentations, visit aerospace customers, attend conferences, and collaborate with our own design or process engineers to improve materials or processes in our products or facilities. Sometimes I feel like a wizard when I describe the physical metallurgy of a product to a non-engineer. I am appreciated as a subject matter expert, I have fun, I learn every single day, and materials engineering is incredibly rewarding.

What is the latest project that you worked on?

Develop a new abradable material for very high gas path temperatures in the power turbine of a new aircraft engine. It must seal the gas path, not damage the rotating blades, be oxidation resistant to high temps, be erosion resistant to particles, and be relatively easy to manufacture at similar cost to current materials.

Has ASM International impacted your career?

I have been a member of ASM since 1986 when my undergraduate adviser recommended it. It has been a valuable resource for learning, property data, collaboration with colleagues in other companies, and keeping up with current news and tech.

What advice would you give to students interested in pursuing a job similar to yours?

Study mindfulness and compassion, not just math and science. People and relationships are key. And truly accept that failure in trying something new is a good thing. It is the only way to really learn, so don't be afraid of what you don't know, don't procrastinate, don't be quiet...get out, share yourself, listen, and embrace the learning.

What should a high-school student do right now if they are interested in your career field?

Study physics, math, chemistry, and thermodynamics. Read journals online related to materials engineering and manufacturing and don't worry about understanding all of it. I found that as I kept up with journals and conferences that were over my head, I gradually understood more and more. Appreciate the context...the need for the material or process. Take a college summer course in materials and/or get to know the professors. Remember that you are an emotional being who uses logic, so, as Brene Brown wrote, "Stay brave, awkward, and kind."

PAUL TIBBALS, PE

Senior Materials Technology Engineer | Retired

Education & Certifications:

BS in Metallurgical Engineering, California Polytechnic State University Sun Luis Obispo;
Professional Engineer License, California; NACE Coatings Inspector Program Level I



ASM Past and Current Volunteerism Snapshot

ASM Golden Gate and Santa Clara Valley Chapters (various positions including Chair, Executive Board member, and other duties)

What are the responsibilities and tasks of your job?

My primary responsibility was performing engineering failure analysis, which in many cases is similar to what a medical examiner or coroner does, except on mechanical or electrical equipment. I used my knowledge of materials manufacturing, production, fabrication, and inspection to determine the most likely cause for the failure of a component or system. The parts I examined were from a wide range of mechanical, electrical, and hydraulic equipment from a major electrical and natural gas utility company. My additional training in high-technology inspection, welding fabrication, and quality control processes was also important to my job. Sometimes I gave legal testimony concerning the outcome of analysis work.

I was the lead investigator for several high visibility failure analyses including being a technical liaison between my firm and the National Transportation Safety Board concerning a major natural gas pipeline failure. Later, we used robots and other types of inspection equipment to examine additional pipelines for safety inspections.

What is a typical day at work?

On a typical workday, I direct and/or perform laboratory tests and inspections on a failure analysis project. We use optical and electron microscopes, chemical analysis equipment, visible light, infrared light, ultraviolet light, magnetic tests, ultrasonic tests, mechanical tests, and electrical tests to determine material properties and to try to narrow down the cause of failure. Each of these tests produces technical documentation and is performed according to test standards. Then I assemble the results and write a report discussing the cause of the problem and possible ways to improve or recover from it. The report has to be well written so that even non-technical customers can understand and apply the results.

What is the latest project that you worked on?

An underground natural gas pipeline had been deformed by earth movement and slippage near an earthquake fault. We used various measuring equipment including laser scanners to determine the amount of deformation, and then analyzed the amount of deformation to determine how much would be acceptable.

Has ASM International impacted your career?

ASM provided a partial scholarship for me to attend college. Participating in the local ASM chapter gave me opportunities for technical education, learning to give technical presentations, and personal and job related networking. Volunteering for leadership positions in the ASM chapter gave me valuable experience and was looked on favorably by my employer as self-directed independent development.

What advice would you give to students interested in pursuing a job similar to yours?

Learn about the various types of engineering. Look into opportunities such as the ASM Materials Camp that can provide exposure to materials engineering concepts. Start up or join a science club or robotics club where you can learn about technical concepts and materials properties, and participate with others working on projects. Learn where science and engineering affect modern society and figure out in what ways that interests you. Engineering is just science and math applied to the real world.

What should a high-school student do right now if they are interested in your career field?

Look up your local ASM chapter on the web. Reach out to some members to find out more about the field, to see if they would be interested in giving a presentation at your school, to find out whether there are job opportunities. And apply for an ASM Materials Camp.

Do you have any closing thoughts?

Materials engineering is a very interesting field that is undergoing rapid growth. Advances in manufacturing such as 3-D printing, surface treatment, metal alloy development, semi-conductors, and medical materials are occurring that will lead to interesting career paths and great employment opportunities. Much of the modern technological world would not be possible without advanced materials engineering behind it.

NICHOLAS CHEROLIS, PE

Senior Engineer | BakerRisk

Education & Certifications:

BS in Metallurgical Engineering, University of Cincinnati
Professional Engineer License, Texas



ASM Past and Current Volunteerism Snapshot

ASM Alamo Chapter (Vice Chair), Failure Analysis Committee (Chair), Eisenman Materials Camp (Mentor), ASM Foundation Mini Camps (Volunteer)

What are the responsibilities and tasks of your job?

I am one of two metallurgists with BakerRisk — we serve on teams that investigate industrial accidents and analyze material failures. We also visit industrial sites and help audit their safety systems and determine the fitness for continued service of damaged pressure vessels.

What is a typical day at work?

Get a call saying we need to be in West Texas as soon as possible, grab an investigation kit and fly there and join my team members to start an investigation that may take anywhere from one day to a few weeks. The other extreme is a quiet day in the lab running the scanning electron microscope to analyze fractures and examining metallographic sections with a light microscope.

What is the latest project that you worked on?

I traveled with a civil engineer to Saudi Arabia to examine an industrial accident scene and map the heat and fire damage and blast pressure contours of the site. This was a solid week of visits to the site to photograph heat damage and blast damage indicators. This information was to help the insurance company estimate the cost to rebuild the facility.

Has ASM International impacted your career?

ASM has been a great way to develop as a professional, participating in the local chapters both as a student and engineer. The failure analysis committee let me interface with others who do what I do and share information. Now it is an ASM Affiliate Society. Taking the opportunity to give talks at conferences on topics I was excited about gave me confidence to author peer-reviewed papers and teach classes to clients on subjects like fractography.

What advice would you give to students interested in pursuing a job similar to yours?

Find something that excites you and look into what undergraduate degree you would need to do that. Personally, I had no vision of my career as a failure analyst while in school. It is just my first assignment, and I loved it so much I stuck with it.

What should a high-school student do right now if they are interested in your career field?

Pay attention to chemistry and physics classes and learn your math. All engineers have to have a good grounding in math to graduate with a BS degree but most metallurgists do not use much more than algebra in their day to day jobs. Not all schools have a materials degree program so you want to find one that does. It really helps to intern or be in a co-op program where you can see what it is the career field offers while you still have the chance to change to something else.

Do you have any closing thoughts?

Everything is made of materials, so there will always be a place for those that understand them. No matter what your degree, there are many options in what area you can work. For instance, there is always the academic track doing research and teaching, which requires a doctorate. Then there are different industries within that field. In materials, you can be involved in basic metals refining and melting or work at a company that makes things from metals or ceramics or composites. Larger companies will have their own materials labs to assess their manufacturing processes or develop new processes. Some materials engineers work with design engineers to define the materials to be used in a component or entire system, these are called applications engineers. Some materials engineers work as consultants in independent materials labs like I do now. They might even become expert witnesses in lawsuits, testifying in court about an analysis they have done. No matter what area you work in, you can always take the managerial track and supervise others who do what you do. Some people are cut out to be individual contributors and specialize in a technology, whatever works for your skillset.

PATRICIA DURANT

Principal, Materials Consultant | Citadel Solutions

Education & Certifications:

BS in Physics, Georgia Institute of Technology; MS in Materials Engineering, Arizona State University; Lifetime Teaching Certificate – Engineering, Manufacturing, and Machine Tool Design, California



What are the responsibilities and tasks of your job?

I consult with design, construction, testing, and manufacturing employees to solve processing and quality control problems based in material properties. I've had success with material solutions in aerospace and semiconductor processing industries, including FAA training and engineering and construction education, as well as creating solutions in manufacturing processing and materials quality control.

What is a typical day at work?

For a well-known integrated circuit company, I was hired to determine the cause of an electronic watch failure. Using a mass spectrometer to sniff micro cans containing the watch chip, I determined the circuit to be contaminated with water, carbon dioxide, and nitrogen. On consultation with manufacturing engineers, I learned that nitrogen had been substituted for a more costly inert gas. Using reaction rate equations, it was easy to show those watches that had failed had sufficient CO_2 or N_2 with water to produce an acid, causing corrosion of the electronic part.

What is the latest project that you worked on?

For a jewelry company, I was hired to prevent metal part curl after the surface of a decorative piece had been surface hardened by peening. The solution involved stress relieving without overheating or oxidizing the surface.

Has ASM International impacted your career?

The journals have been particularly helpful in keeping up with newly made alloys, processing techniques, and ASTM and ISO testing requirements. As an engineering professor, ASM information helped keep me informed as to the new directions of materials research and applications.

What advice would you give to students interested in pursuing a job similar to yours?

The sciences of chemistry and physics are of course important. But so are practical courses such as metals shop, computer aided design, welding, and other hands-on classes which let you visualize and feel how materials behave.

What should a high-school student do right now if they are interested in your career field?

Find an ASM member to help you with your preparation. School guidance counselors usually are not familiar with the materials career field.

Do you have any closing thoughts?

We are so used to using the manufactured objects around us (e.g. cars, toasters, buildings, electronic readers) that we forget that someone thought about and designed those items. Begin today to look closely at the objects you come in contact with. Think about how they were designed and then constructed. It's informative and fun.

DR. CHRISTOPHER MARVEL

Research Scientist | Lehigh University

Education & Certifications:

BS in Materials Science and Engineering; Ph.D. in Materials Science and Engineering, Lehigh University



ASM Past and Current Volunteerism Snapshot

ASM Lehigh Valley Chapter (Vice Chair), Emerging Professionals Committee (Member)

What are the responsibilities and tasks of your job?

As a research scientist in the materials science and engineering department at Lehigh University, I conduct experiments, publish journal publications, write research proposals, co-advise graduate and undergraduate students, and teach university courses. A lot of my research revolves around using atomic-resolution electron microscopes to study the atomic structure of materials and how the atomic structure dictates the way materials behave.

Teaching a college level course on ceramics is probably one of my biggest accomplishments. I have also started collaborating with the Army Research Laboratory and working on several very interesting and applicable research projects.

What is a typical day at work?

I spend a lot of time learning! Almost every day I read journal publications written by other research groups to develop a better understanding of my own research, collect data on a variety of advanced electron microscopes, and I have conference calls with collaborators to share results and learn about their progress. I am a very curious individual and love learning, so I enjoy my job every day.

What is the latest project that you worked on?

The latest project that I worked on was developing low-density ceramics to be used as body armor. This work is conducted with the Army Research Laboratory and we learned that we can control the material on the atomic scale to improve material performance.

Has ASM International impacted your career?

ASM International has certainly impacted my career. It has given me an outlet to meet new people that share my professional passions and it has enabled me to work with students from my local community. I have learned a lot from my mentors within ASM and I would not be as successful if I did not have their support.

What advice would you give to students interested in pursuing a job similar to yours?

Push your boundaries and share your passion to help motivate others around you. Engineering can be challenging, so you will constantly have to push yourself. It is also important to know that it is ok to fail, and in fact, failing sometimes happens more often than succeeding. It is also important to always strive to make progress, and if you show your passion at work every day, you can help inspire others around you and make a positive and supporting work environment.

What should a high-school student do right now if they are interested in your career field?

Watch YouTube. There is a lot of content that you can watch for free and learn about materials science. Some of it is really cool and it shows firsthand how materials behave. Then, if there is any sort of topic that really interests you, search online and determine which universities specialize in the fields of science that interest you the most. Apply to those schools and work hard to achieve your goals.

Do you have any closing thoughts?

Materials science has been a very rewarding field of study, and I personally am looking forward to having a long career!

DR. RAY CLAXTON, PE

President | Claxton LLC

Education & Certifications:

BS in Metallurgical Engineering, Colorado School of Mines; MS in Mechanical Engineering, Arizona State University; Ph.D. in Mechanical Metallurgy, Case Western Reserve University; Professional Engineer License, Texas, New Mexico, and Arizona



What are the responsibilities and tasks of your job?

I founded and grew an engineering consulting company over a 30-year period, Materials Analysis, Inc., which I sold in 2012 to ESI. After serving on the ESI Board, I left to return to private practice as Claxton LLC. I work as an expert witness for manufacturers who have been sued in product liability litigation. Clients include major utility companies, manufacturers of oil field tubular goods, airframe and engine manufacturers, and others. I hold 13 US patents for product and process inventions.

What is a typical day at work?

I evaluate the facts and circumstances surrounding the accident or loss, which includes hardware remains such as aircraft wreckage, engine remains, power transmission lines, and/or fractured oil well casing. Also, there are 10,000 to 20,000 pages of technical documents produced by the different parties which I review. I conduct my own inspection of the hardware including metallurgical testing and evaluation. I then write an expert report with opinions and sit for a deposition answering, under oath, all questions from other parties. I then testify at trial for my client, and am subsequently cross-examined by attorneys for opposing parties.

What is the latest project that you worked on?

Working now on three helicopter and one fixed-wing accidents, three down-hole casing failures in horizontal fracking wells, and three electrical power distribution electrocution accidents.

Has ASM International impacted your career?

I am now 75 years old. I think I joined ASM when I was 20. It is the most reliable resource on the planet for metallurgical information.

What advice would you give to students interested in pursuing a job similar to yours?

Math classes are the wind sprints of engineering. In football, if you don't practice and do the wind sprints, you don't get to play Friday night. Your current performance in math and other technical subjects will determine whether or not you will be admitted to an engineering school. Don't blow it. Keep all your options open.

What should a high-school student do right now if they are interested in your career field?

Don't play around. Get serious. Go ahead and be a nerd. Make good grades. People will still be looking at your current track record 50 years from now in evaluating your abilities.

Do you have any closing thoughts?

Professional engineering has been my life, and it has been very good to me. I have two homes: Scottsdale, Arizona for winter, and Taos, New Mexico for summer. I'm working now only for the enjoyment of the challenge. I've been fortunate, but I owe it all to education and the profession.

BETH SNIPES, FASM

Senior Materials Engineer | Technology for Energy Corp.

Education & Certifications:

BS in Materials Engineering, North Carolina State University

MMS in Materials Science, The University of Virginia



ASM Past and Current Volunteerism Snapshot

ASM Oak Ridge Chapter (Executive Committee Member), ASM Central Virginia Chapter (Executive Committee Member), ASM Carolinas Central Chapter (Student Member), Chapter Council (Member), Volunteerism Committee (Member), Women in Materials Engineering (Member)

What are the responsibilities and tasks of your job?

I have worked at TEC for 35 years. During this time, I have helped design three generations of portable x-ray diffraction equipment. I have developed residual stress and retained austenite measurement applications and taken the technical lead for the lab's accreditation program. I am currently the lab supervisor with responsibility for products and services.

What is a typical day at work?

I spend my time talking to potential customers to help them solve their materials problems. I help the lab to optimize measurements and report results to customers. I am always looking for opportunities to educate and assist the engineering community about residual stress and retained austenite.

What is the latest project that you worked on?

The last major project was the commercialization of a miniature, portable x-ray system to make residual stress and retained austenite measurements in a field environment.

Has ASM International impacted your career?

I am a materials engineer because of ASM International. I was working in an engineering lab as an undergraduate student majoring in biology. ASM International sponsored a paper contest where I presented my lab work. I won the contest, along with a \$25 prize (big money in 1975). I changed my major to materials engineering and have had an exciting career. As an engineer, ASM International has been a great resource for networking and materials information. Leadership skills, technical knowledge, and connections have been major benefits of being an ASM International member.

What advice would you give to students interested in pursuing a job similar to yours?

Determine what your talents are and what you love to do. There are so many opportunities in materials science and engineering that most students can find that special position that will allow them to grow and blossom. Keep in mind that you can continue to have options once you start your career.

What should a high-school student do right now if they are interested in your career field?

Study hard! A good foundation in the sciences and English will help regardless of your career path. The sciences relation to engineering is obvious. The reason I recommend a good foundation in English is to help you communicate the exciting discoveries that you will make in engineering.

Do you have any closing thoughts?

Materials engineers can be found almost everywhere. The field can support and catapult you to reach your dream life.

DR. ATIN SHARMA

Principal Engineer | Siemens Energy Inc.

Education & Certifications:

BS in Metallurgical Engineering, Indian Institute of Technology — Varanasi

Ph.D. in Materials Science and Engineering, State University of New York — Stony Brook



ASM Past and Current Volunteerism Snapshot

Thermal Spray Society (an ASM Affiliate) Membership, Marketing and Outreach Committee (Chair), International Thermal Spray Conference (Session Chair), Journal of Thermal Spray Technology Best Paper Selection Committee (Judge), ASM-TSS Best Practices Committee (Member).

What are the responsibilities and tasks of your job?

In my current role, I am responsible for managing the research and development of technologies for advanced coatings used in industrial gas turbine and steam turbine engines. Some of my tasks include planning, designing and executing the technical aspects of my R&D programs, monitoring and controlling the program budget and schedule, supporting qualification of IGT component coatings in-house and for external suppliers, supporting resolution of quality issues, serving as reviewer for technical design reviews, writing internal technical reports and sometimes, writing technical papers for journals and conference presentations.

What is a typical day at work?

A typical day at my job consists of two major components; planned day-to-day activities to support the long-term project goals, and unplanned walk-in work, such as emails needing urgent (technical) support. For example, for a long-term project with a deadline at the end of the year, I may have planned some experimental work or analysis to be conducted today. Then someone walks up to my desk and tells me about an urgent issue regarding a quality notification in a product that needs advice/disposition. Therefore, understanding what is “important” and what is “urgent” and learning to prioritize the tasks is a critical skill.

What is the latest project that you worked on?

We work simultaneously on multiple projects. More recently, I have been working on advanced clearance control (also called abradable) coatings for new engines. These types of coatings are critical to reduce the leakage of the hot gases and improving engine efficiency. Another project involves development of new thermal barrier coatings to protect the turbine components from the very high firing temperatures in the new engines.

Has ASM International impacted your career?

ASM has given me a great deal of networking opportunity. I have found many friends and some great mentors through ASM (Thermal Spray Society). There is also a wealth of knowledge available at ASM. I was particularly helped by the *ASM Handbook: Thermal Spray Technology* as well as numerous technical papers from ITSC (International Thermal Spray Conference) and JTST (*Journal of Thermal Spray Technology*) throughout my career.

What advice would you give to students interested in pursuing a job similar to yours?

Pursue your passion or develop a passion for whatever you do. Then your job will not be boring, burdensome or a mere source of income but something fun that you enjoy doing every day. Focus on learning the basics of the coursework today in whichever grade you are. Strong basics will help you be technically strong and confident. This way, you will continue to further your learning as you go without any embarrassment and be successful in your field.

What should a high-school student do right now if they are interested in your career field?

When I was in high school, I had no idea about the specialized fields of materials science and coatings. I barely knew about the basic engineering disciplines like computer science, electronics, mechanical and chemical engineering, etc. Today's high-school students are much more advanced and resourceful and not surprisingly some may already have developed a genuine interest in specialized fields like materials science. All I can suggest is to learn more about the field so you can make an educated choice! Try to participate in an ASM Materials Camp and other opportunities to learn about materials science and engineering. If possible, talk to people in the field to ask about what they do and what their experience and advice would be. Over time, you will get a better sense of the strength of your interest in the field.

DAVID JONES

Senior Principal Materials Engineer | Stryker

Education & Certifications:

BS in Metallurgical Engineering, University of Wisconsin – Madison; MS in Surface Analysis, University of Surrey – Guildford; Certification in Laser Welding, University of Wisconsin — Madison



What are the responsibilities and tasks of your job?

I provide technical expertise across multiple divisions in my company. I travel to many locations around the world working on material specific problems. I help with welding problems/questions, heat treating, and numerous questions that come up from around the globe.

What is a typical day at work?

A typical day for me is hard to describe. One of the things I love about my work is that there is a huge variety of questions that come across my desk. I may be asked, “what is this white looking stuff on my plastic handle” to talking with the head of a research lab about how better to design this particular part. I get to talk with some of the smartest people in the world in their particular field. I’m always learning new things.

What is the latest project that you worked on?

I am typically working on multiple projects at the same time. I am involved in projects ranging from research projects that may take years to develop to simple two minute questions.

Has ASM International impacted your career?

ASM is a great place to meet other professionals from a variety of different fields. I actually got my current job because of ASM.

What advice would you give to students interested in pursuing a job similar to yours?

Learn as much as you can. You can never know too much. Gain a deep understanding of the basic underlying principles of materials. It is necessary to understand the basics before you can handle the complex.

What should a high-school student do right now if they are interested in your career field?

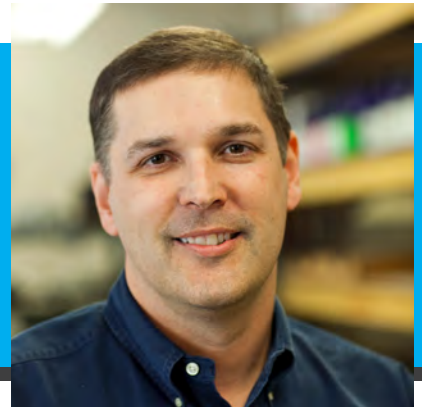
Pick up a hobby that helps you get hands-on experience working with materials. There is no substitute for knowing how something works through actual hands-on experience.

WILLIAM JAROSINSKI, FASM

Director R&D Materials | Praxair Surface Technologies, Inc

Education & Certifications:

BS in Materials Engineering & MS in Materials Engineering (Metallurgy), Purdue University; MBA in Finance, Butler University



ASM Past and Current Volunteerism Snapshot

ASM Indianapolis Chapter (Chair, Vice Chair, Treasurer, Scholarship & Financial Chairman), Thermal Spray Society (an ASM Affiliate) Membership, Marketing, and Outreach Committee (Member), iTSSe, the official newsletter of the ASM Thermal Spray Society (Editor), published as a supplement in Advanced Materials and Processes magazine, ASM Indianapolis Chapter Materials Camp (Organizer)

What are the responsibilities and tasks of your job?

I develop advanced materials and work with teams to solve critical applications for industry. Solutions increase customers' part life in severe environments combating oxidation, corrosion, high temperature and wear.

What is a typical day at work?

I solve customer problems by identifying needs (material properties) and matching them with our capabilities (processes that form repeatable microstructures). I travel to visit customers and plant locations, attend meetings in-person and through teleconferences, develop an understanding of industry practices and previous solutions (practical research), deliver reports and presentations, conduct laboratory tests and evaluations, and make recommendations to improve the process. This results in new products or solutions in new industries.

What is the latest project that you worked on?

Improving Ni-based superalloy compositions to improve quality and productivity of 3D printed metal parts used in aviation and other industries.

Has ASM International impacted your career?

Material Advantage membership (partnership between ASM, TMS, ACerS, and AIST) in college allowed for travel to technical meetings (with partial subsidies). This reinforced my desire to work in a technical field that allowed for continuing education by attending conferences throughout my career.

What advice would you give to students interested in pursuing a job similar to yours?

Take as many STEM classes as possible and pursue engineering if you like solving many practical problems. Pursue an advanced technical degree if you would like to spend more time solving fewer but more difficult problems.

What should a high-school student do right now if they are interested in your career field?

Besides taking as many STEM classes as possible, seek opportunities to visit and learn more about what engineers, scientists, and other STEM professionals do in their careers.

Do you have any closing thoughts?

Materials engineering is particularly interesting because all other forms of engineering are dependent upon the materials they select and use. Material solutions in one field can be leveraged in another, allowing materials engineers to move between industries.

DR. LAURA MOYER

Manager of Metallography, LOM, and XRD &
Director LUSEI | Lehigh University

Education & Certifications:

BS in Materials Science and Engineering & MS in Materials Science and Engineering &
Ph.D. in Materials Science and Engineering, Lehigh University



ASM Past and Current Volunteerism Snapshot

ASM Lehigh Valley Chapter (Chair), Lehigh University/ASM Lehigh Valley Chapter Materials Camp (Director), Lehigh University/ASM Lehigh Valley Chapter Teachers Camp (Director), Lehigh University Material Advantage Chapter (Faculty Advisor), ASM International Education (Instructor), International Metallographic Society (an ASM Affiliate Society) (Board Director) and International Metallographic Society (an ASM Affiliate Society) Education Committee (Chair).

What are the responsibilities and tasks of your job?

I have a unique role at Lehigh University and I enjoy the different responsibilities of my position. I am the lab manager so I take care of equipment, train students, ensure safety, etc. I also teach several courses to the undergraduate students that provide them with hands-on laboratory experience. In the summers at Lehigh, I am the director of three different programs: The Lehigh University Summer Engineering Institute, LU/ASM Student Materials Camp, and LU/ASM Teacher's Camp.

What is a typical day at work?

My day is always busy but I prefer that to being bored at a job. I usually start much earlier than the students so I can check my emails and respond, check the labs and make sure they are ready for the day, and do any other prep work that is needed. Once the students arrive, I am here to assist with any help needed, whether it be help with equipment or help finding a job for the summer. I also hire work study students each semester to help with projects that we are working on within the department. In the afternoons, I am typically teaching lab — we could be casting aluminum, heat treating steel, pulling tensile bars — it's an exciting way for the students to learn the concepts they hear about in lecture!

What is the latest project that you worked on?

I am always working on several projects. One that I have right now is materials characterization for some ancient Peruvian artifacts (from the early AD years). We are looking to determine if the artifacts are authentic. We can do this by determining how they were made, what materials were used, where the materials are from, etc.

Has ASM International impacted your career?

ASM International has been a great way for me to network throughout my career. The MSE world isn't all that big and through ASM I have met some really amazing people who I now know well enough to call for advice, ask for a favor, collaborate with, etc. ASM also gives me the opportunity to get involved with teaching and outreach programs which are so important to our younger generations!

What advice would you give to students interested in pursuing a job similar to yours?

I would say do what makes you happy. You certainly don't want a job that you are bored doing everyday. I enjoy my job a lot because it changes all the time and I also learn a lot too which is important to me. I didn't always work at Lehigh, before here I worked in industry and really loved that job too. I think my experience in industry is extremely beneficial to my current role in teaching. Materials are everything that IS... so the possibilities for a career in MSE are endless!

What should a high-school student do right now if they are interested in your career field?

As I tell my own kids, work hard in high-school, go to college, and make the decision to major in what would make YOU happiest! Many kids come into college with an idea of what they want to major in but they really don't know what it entails. Ask a professor, an upperclassman, or people in the industry. Also, if you want to be in MSE, come to one of the student camps — we promise you will have a great time learning all about materials!

JOE DEGENOVA

Technical Sales Representative | Ellwood Quality Steels

Education & Certifications:

BS in Materials Engineering, Case Western Reserve University



ASM Past and Current Volunteerism Snapshot

Emerging Professionals Committee (Member, Co-Chair), ASM Board of Trustees (Student Board Member), ASM Cleveland Chapter (Executive Committee Member)

What are the responsibilities and tasks of your job?

Outside sales supporting customer needs across multiple ferrous, Ni-based, and metal systems in several industries. Provide technical support to internal and external customers on material-related processing/development initiatives.

What is a typical day at work?

There is no “typical” day. Depending on the customers that call, materials we are melting, and ongoing technical work, the day can vary significantly and change instantly. Having the ability to wear multiple hats and switch quickly is important.

What is the latest project that you worked on?

Assisting in the development and process improvement of a new material for customer needs.

Has ASM International impacted your career?

ASM improved my network of both friends and coworkers, in addition to helping secure a career. While I was not hired through ASM, it was definitely a talking point and significant extracurricular activity of mine during college.

What advice would you give to students interested in pursuing a job similar to yours?

Reach out to people in the industry and ask questions important to you. There are no “right” questions to ask. It is most important to get a feel for what you enjoy doing. Additionally, always be willing to be taught and accept that you don’t know everything. Being coachable and inquisitive goes a long way to future success.

What should a high-school student do right now if they are interested in your career field?

Ask questions and get a feel for the roles materials engineers fulfill. Pursuing a technical degree is important, but talking to individuals in industry and learning about life outside of school is paramount to developing yourself and increasing your network for those that want to work in industry.

Do you have any closing thoughts?

“Do today what others won’t, so tomorrow you can do what others can’t.” Excellent words to live by to create future success.

JOSH YOAKAM, PE

Mechanical Integrity Engineer | HollyFrontier

Education & Certifications:

BS in Mechanical Engineering, University of Cincinnati; Professional Engineer License, Michigan and Oklahoma; National Board of Pressure Vessel Inspectors, NBIC Inspector Commission (exp.); API 510 Pressure Vessel Inspector; API 653 Storage Tank Inspector



What are the responsibilities and tasks of your job?

Provide interpretive guidance used to determine suitability of existing fixed equipment assets, such as process piping, pressure vessels, and storage tanks. Recognize types of deterioration affecting this equipment, and recommend materials of construction for new and existing assets. I may get involved when repairs are required, deciding what actions should be taken and what materials are required.

What is a typical day at work?

My day is a series of mini-conferences with others to listen to concerns about continued safe and reliable operating ability. In these meetings, I often speak from a consulting role, providing engineering services and information required to meet the requests. I may spend time looking at broken parts, trying to determine what caused it to no longer work correctly. I also write specifications to be followed during the procurement process, and discuss the progress of work being done for my company by other contractor and engineering services providers. If I was to characterize my job at this time, I would say I spend a lot of time communicating.

What is the latest project that you worked on?

Projects, for me, are often short duration support (provide information for people trying to understand what is happening to their equipment and how to assure it can be run safely). Today I am helping a project manager by reviewing materials for a heat exchanger to be used in a new process; we are attempting to improve service life by studying corrosion rates and determining performance of a number of different alloys.

Has ASM International impacted your career?

I only joined ASM five years ago, but I appreciate the access to educational resources ASM provides. It is important to belong to professional groups throughout your career; I am a member of three others at this time and enjoy the relationships I've made in those.

What should a high-school student do right now if they are interested in your career field?

I did not know I had an interest in materials until I graduated from college, and came to work in a manufacturing industry. So I would tell you to get used to the process of learning new things, and finish what you start. If it's generally interesting to you now: go through the Engineering curricula and keep your mind open about what you can do later, it will probably not be the title you expect today.

Do you have any closing thoughts?

Learning to get along with co-workers will prove more rewarding than you know. Engineers are responsible people, and all professions need responsible people. Success is not all about good grades; it's about hard work and not quitting when the problem isn't clear.

DR. ROBERT CARBONARA

Senior Analyst | SEA Limited

Education & Certifications:

BS in Physics, University of Pittsburgh

Ph.D. in Materials Science, University of Cincinnati



ASM Past and Current Volunteerism Snapshot

ASM Columbus Chapter (Chair, Vice Chair), ASM Carolinas Central Chapter (Chair, Vice Chair), *Journal of Materials Engineering* (Editorial Review Board), *Journal of Materials Shaping Technology* (Editorial Review Board)

What are the responsibilities and tasks of your job?

Forensic materials analysis of product failures and determining product failures in the cause of accidents and personal injuries.

What is a typical day at work?

Examine products to determine failure mode and relate the failure mode to the incident. Reading accounts of the incident. Reading standards and scientific literature related to the incident.

What is the latest project that you worked on?

Failure of a 20 lb. light fixture that fell from 100 feet and seriously injured someone.

Has ASM International impacted your career?

ASM has allowed me to make many contacts with peers and explore new ideas.

What advice would you give to students interested in pursuing a job similar to yours?

Work hard, hone your analytical skills, be observant of details. While keeping in mind the details, see how they fit into the big picture. And most of all — argue against the theory you think is right.

What should a high-school student do right now if they are interested in your career field?

Study hard and get a good understanding of the world around you. Academics are very important but understanding how people and events are linked is critical.

Do you have any closing thoughts?

Work hard to get a good scientific education; however, don't let your education hold you back, i.e., always put forth your best effort. Don't rely on your degree(s) to carry you and your ideas.

ALEENA ROSS

US & LATAM HSE Leader — Process & Pipeline Services
Baker Hughes

Education & Certifications:

BS in Materials Engineering, Case Western Reserve University

BA in Art History, Case Western Reserve University



ASM Past and Current Volunteerism Snapshot

Collegiate Member (4 Years), Emerging Professionals Committee (Member)

What are the responsibilities and tasks of your job?

As an HSE leader, I support multiple service facilities that work in the pipeline inspection, pre-commissioning and maintenance fields in the United States and Latin America regions. My responsibilities include overseeing the health and safety of all employees on-site as well as in the field at client locations throughout a variety of tasks from office work to welding, as well as ensuring we are not causing any harm to the environment or communities where we work.

What is a typical day at work?

Typical is a word that may not describe my tasks, but my attitude towards work. A typical day is coming into work and immediately connecting with my customers, for me that's our employees out in the field and in the office to identify immediate needs. Checking in with them and making sure that they can do their job safely is my number one priority.

Improvement projects, compliance, event investigations and several other topics also follow under my scope. These areas fluctuate in time consumption depending on the current state of the business.

What is the latest project that you worked on?

I recently closed out a large waste optimization program that stemmed from a metallurgical waste stream issue. Combining my materials science background with new environmental skills allowed me to bring my two passions together.

Has ASM International impacted your career?

ASM has shown me that there is no limit on my potential and I am in control of where my career takes me in the future.

What advice would you give to students interested in pursuing a job similar to yours?

Don't limit yourself to what is "recommended" for a field of interest. Study something that inspires you and apply the skills you learn to any industry.

What should a high-school student do right now if they are interested in your career field?

If a high school student is interested in joining the manufacturing or HSE world, I would recommend looking for local internships or experience in a small machine shop or plant or even working at home and getting familiar with tinkering. This allows for better understanding when you are in a larger environment and have a need to be looking for possible hazards and assessing risk.

Do you have any closing thoughts?

Take advantage of any opportunity to learn more: join a committee, take a course outside of school, ask your parents or others about their work, and determine what it is that you are passionate about.

DR. JOHN TARTAGLIA, FASM

Senior Metallurgical Engineer and Engineering Manager Element Materials Technology

Education & Certifications:

BS in Materials Engineering & Ph.D. in Materials Engineering,
Rensselaer Polytechnic Institute



ASM Past and Current Volunteerism Snapshot

Metallurgical and Materials Transactions (Key Reader), Handbook Committee (Member), Nominating Committee (Member), *Journal of Materials Engineering & Performance* Editorial Committee (Member), Content Committee (Member), ASM Detroit Chapter (Chair, Secretary, Treasurer, and Publicity Committee Chairman)

What are the responsibilities and tasks of your job?

As a senior metallurgical engineer, I conduct failure, defect, corrosion, physical, and mechanical metallurgical analyses. I do consulting, participate as an expert witness in metallurgical and materials engineering matters, and do industrial training for steels (plain carbon, alloy, tool, and stainless), cast irons (ductile and gray), nonferrous metals (aluminum, magnesium, copper, and refractory), powdered metals (steels and other alloys), nonmetallic materials (mostly semiconductors and some polymers), and device implant metals. Customers include the automotive companies, automotive suppliers, other companies, research arms of professional associations, and the legal community. I serve as an expert in optical microscopy, scanning electron microscopy, energy dispersive spectroscopy, corrosion and embrittlement problems, fatigue properties, and a wide variety of mechanical testing.

As an engineering manager, I manage the Element Wixom Engineering Department consisting of engineers and other engineering assistants. I handle new customer contacts and selected complaints, assign and direct service and research project work, and author and review engineering and laboratory reports, technical peer-reviewed publications, and marketing literature. I manage Element Wixom technical and testing procedure interactions with three ASTM committees and develop standard operating and quality procedures. I also co-manage technical and policy interactions with A2LA (American Association of Laboratory Accreditation).

I also teach Element Wixom courses for customers on the following topics: Metallurgical Testing, H13 Die Steel Qualification & Usage, Electron Microscopy and Microanalysis, Fatigue and Fracture Toughness, Microstructures and Other Aspects of Alloys, Medical Materials, Failure Analysis, Standards, and Expert Witnessing for the Legal Profession.

What is a typical day at work?

I meet with customers and discuss their testing and analysis needs. I quote, initiate, and direct projects for metallurgical testing, fatigue testing, and metallurgical analysis. I perform optical microscopy and scanning electron microscopy. I write reports and review those of other engineers who work with/for me. I write published papers for journal publication, performance appraisals, and marketing pieces.

What is the latest project that you worked on?

An analysis of a washer that failed on an electric power transmission line tower.

Has ASM International impacted your career?

It has served as a wonderful source of networking, knowledge, and professional growth.

What advice would you give to students interested in pursuing a job similar to yours?

Work hard to understand your math, physics, and chemistry coursework. Also, work hard to write and present well.

What should a high-school student do right now if they are interested in your career field?

Apply to an engineering school and major in materials engineering or mechanical engineering with a heavy concentration of materials. A capstone design project is a requirement of most engineering degrees in the college junior and senior years. Make sure to get a design project that has a strong materials emphasis.

Do you have any closing thoughts?

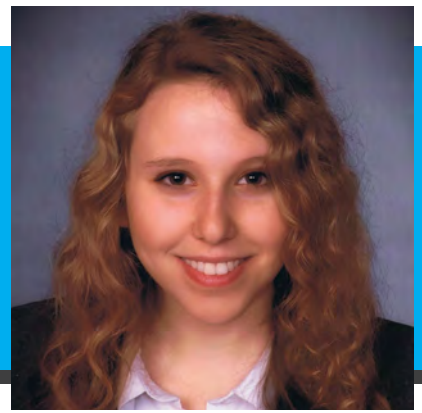
Materials is a fascinating topic. The lab testing equipment (including electron microscopes) and material samples are not commonplace and they are fun to handle. You can work in materials development, production, and adoption for design. Although there are traditional material topics, new materials are being discovered constantly. Both old and new materials are important to society, and they are fun to develop and analyze.

SARAH STRAUB JAKSE

Reliability Engineer | ExxonMobil

Education & Certifications:

BS in Materials Engineering, Rensselaer Polytechnic Institute



ASM Past and Current Volunteerism Snapshot

Emerging Professionals Committee (Member), ASM Board of Trustees (Student Board Member), Women in Materials Engineering Committee (Member)

What are the responsibilities and tasks of your job?

I lead cross-functional improvement team efforts involving technical, mechanical, and operations representatives. I also support Root Cause Failure Analysis (RCFA) for process safety, financial, and environmental incidents, drive financial decision making by facilitating life cycle cost and benefit to cost analyses for business teams, and coordinate evaluation of reliability metrics to support annual reviews and strategic planning.

What is a typical day at work?

A typical day in the refinery is half of the day in meetings at various control centers facilitating reliability discussions and half of the day working on project reviews and reliability data analysis.

Has ASM International impacted your career?

Both the overall ASM international organization and ASM Houston have enabled me to learn, network, and volunteer in the best ways.

What advice would you give to students interested in pursuing a job similar to yours?

Engineers are problem solvers, communicators, and collaborators. Anyone with these characteristics has the potential to be a great engineer!

What should a high-school student do right now if they are interested in your career field?

Continue learning and working hard in all your subjects. Ask for help when you need it. Explore opportunities to learn more about engineering by shadowing or learning from engineers in your community.

DR. JOHN RUMBLE JR., FASM

President and CEO | R&R Data Services

Education & Certifications:

BA in Chemistry, Cornell University; MA in Chemistry, City University of New York;
Ph.D. in Chemical Physics, Indiana University



ASM Past and Current Volunteerism Snapshot

ASM/NBS Phase Diagram Program and Committees (Member), Materials Informatics (Member)

What are the responsibilities and tasks of your job?

R&R Data Services is a small consulting company that focuses on scientific and technical (S&T) data. Among our major projects over the last few years are projects on developing new approaches to materials informatics, the availability of ceramics data, and advancing nanoinformatics. In addition, we do much work on the quality of all types of S&T data.

What is a typical day at work?

As a consultant, there are no typical days, though virtually everything I do lies within the domain called “Computational Materials Science.” Some days I collect and evaluate scientific data. Other times, I am working on standards for nanoinformatics. I often get involved in discussion of policy questions related to the availability and quality of data, such as open access issues. My work is the intersection of materials, chemistry, and physics with data science. This includes using new tools such as artificial intelligence and machine learning to develop and discover new materials.

What is the latest project that you worked on?

Transforming traditional published data handbooks into online data resources.

Has ASM International impacted your career?

Yes, very much so. First, ASM has allowed me to network with other experts in the field of materials informatics and computational materials science throughout the world. This has been key to developing new working relationships. Second, ASM has supported these fields through sponsorship of workshops, sessions at national and international meetings, and working groups, resulting in sharing knowledge across disciplines and borders.

What advice would you give to students interested in pursuing a job similar to yours?

Today, computational materials science offers great possibilities to advance materials science. To become proficient in this area, one needs to develop expertise in modeling, informatics, data science (machine learning and AI), and materials science. Anyone interested in this field should take as many data science courses as they can.

What should a high-school student do right now if they are interested in your career field?

Take as much math, science (physics, chemistry, and biology), and programming as possible. Try to meet with a materials scientist working locally to learn about the excitement in today’s materials world.

If you would like more information, please feel free to contact John at john.rumble@randrdata.com.

THOMAS STEIGAUF, PE

Principal Materials Engineer | Medtronic

Education & Certifications:

BS in Metallurgical Engineering, University of Minnesota

Professional Engineer License, Minnesota



ASM Past and Current Volunteerism Snapshot

ASM Volunteerism Committee (Member), ASM Minnesota Chapter (Executive Board Member, Past Chair), ASM Minnesota Chapter Materials Camp (Co-Chair), ASM Minnesota Chapter Annual Symposium (Co-Chair)

What are the responsibilities and tasks of your job?

Serve as a technical resource across the business. Develop materials technology solutions for component and device level designs for implantable products. Support released product and production facilities with material concerns.

What is a typical day at work?

Work with suppliers to ensure incoming materials meet our requirements. Conduct research on new materials for future products. Test materials, analyze the data, and write reports.

What is the latest project that you worked on?

Conductor wires for neuro stimulation applications. We are looking at improvements for low Ti MP35N lead wires.

Has ASM International impacted your career?

ASM has been a huge part of my career. My involvement in ASM is directly responsible for two of my past jobs. The contacts and friends I have made in ASM are fantastic people and they continue to help my career.

What advice would you give to students interested in pursuing a job similar to yours?

Stay in math and science classes. Take English writing classes. Like it or not, if it isn't written down it never happened. Don't let a difficult class or subject beat you. Stick with it. We all must do things we don't like to get to an end goal we want.

What should a high-school student do right now if they are interested in your career field?

Stay in math and science classes. You can choose any career path if you have math and science. Without these, you start to limit your degree and career.

LLOYD MEISSNER, PE

Metallurgical Engineer / Forensic Engineer
Crane Engineering / Engineering Systems, Inc.

Education & Certifications:

BS in Metallurgy/Materials Science, Michigan Technological University
Professional Engineer License, Minnesota



ASM Past and Current Volunteerism Snapshot

Career Fair (Mentor), and STEM volunteer.

What are the responsibilities and tasks of your job?

Performing failure analysis and consulting on industrial and legal projects varying widely in scope related to metals, plastics and other materials.

What is a typical day at work?

Examining broken motorcycle foot pegs (Cast zinc), fractured tungsten wires from air ionizers, paprika particle size examination by SEM/EDS, inconel valve seat analysis from a nuclear power plant.

What is the latest project that you worked on?

Failed pipe from a wet sprinkler system in a large industrial warehouse.

Has ASM International impacted your career?

ASM has given me an avenue to interface with other professionals in my field and access to a wide variety of materials data.

What advice would you give to students interested in pursuing a job similar to yours?

Focus on math and science (STEM). Take as many electives as possible. Pursue college credits in high school (PSEO options) for free college credit.

What should a high-school student do right now if they are interested in your career field?

Enter science fair competitions, look at ASM Materials Camp options, and take advanced math and science classes.

Do you have any closing thoughts?

Talk to people about their jobs in person, shadow them at work if possible, listen and ask questions, get your hands dirty experimenting, be respectful. Put your phone down and think.



ASM PROGRAMS FOR YOU AND YOUR TEACHER

Want more information on this exciting industry? Check out the below programs ASM has available for your teachers and students like you.

K-12 Teacher Grants

Your teacher may be eligible for a grant to bring materials science education and projects to your classroom. More detailed information on applying for these grants can be found at www.asmfoundation.org.

Materials Camps for Teachers

Talk to your teacher about the ASM Materials Education Foundation's Materials Camp for Teachers professional development program! The program encourages teachers to share materials science with their students to see the world around them as one in which science is transformed into technology through engineering. See camp schedule at asmfoundation.org.

Materials Camps for Students

If you are an incoming junior or senior, be sure to check out the ASM Materials Education Foundation Materials Camp program. These camps, located throughout the United States, are often offered at no cost to attendees, sometimes residential, and will introduce you to materials science and engineering concepts in a fun environment. See camp schedule at asmfoundation.org.

Tallo

ASM is proud to be a partner with Tallo, an online platform where you can create a digital profile, see how you stack up with other students, and connect with companies, organizations, and associations (like ASM!). Tallo is free to use. To create your profile, visit tallo.com/asm.

Local Chapters & Scholarships

ASM has many local chapters. We encourage you to see if one is in your area and to get involved. They are always thrilled to have students attend their events and many offer scholarships for students in the local area. For more information on local chapters, please visit asminternational.org/societies/local-chapters/local-chapters.

ASM Membership

For those in middle or high school, ASM offers membership for just \$15 per year. You will get access to our membership magazine, the ability to add a membership badge to your Tallo profile, and access to your local professional chapter if one is in your area. Middle/high school membership is a great way to start getting involved in the materials science and engineering industry.

About to graduate and go to college?

ASM has many great programs for those in college, from design competitions to a robust student chapter structure. ASM is a partner in the Material Advantage Student Program. For a single, low-cost fee, you can join ASM as well as the Association for Iron & Steel Technology (AIST), the American Ceramic Society (ACerS), and The Mineral, Metals, and Materials Society (TMS) as a college member. This membership option is available exclusively for full-time university students. To learn more about Material Advantage, visit materialadvantage.org.

The ASM Materials Education Foundation offers scholarships for undergraduate materials science majors and community college students in a materials-related program. While these scholarships are not usually given to a first-year student, once you have declared your major or selected your program you may be eligible for these scholarships. For more information, visit asmfoundation.org.

For any questions, please email students@asminternational.org.

