including health, security, communication, mobility, energy and environment. One of its most well-known innovations is the mp3 format.

Fraunhofer USA Center for Coatings and Laser applications (CCL) was established in partnership with MSU in 2003 and is located in the Engineering Research Complex. Fraunhofer CCL’s goal is to bridge the gap between industry and research. Its clientele includes federal and state governments, multinational corporations, and small to medium-size companies. Under the direction of Professor Jes Asmusson and division manager Dr. Thomas Schuelke, Fraunhofer collaborates with many MSU faculty members on a wide variety of projects. Graduate students work with Fraunhofer employees and interns in the shared laboratory.

Current work in our lab includes; coating substrates/objects with various materials—metals, semiconductors, ceramics and carbon based (diamond like) coatings, diamond growing, etching, polishing and doping (implanting specific “impurities”, such as boron); designing plasma sources and reactors, process development, material characterization and testing, device fabrication.

One of the projects that we are working on is patterning diamond. Due to the hardness of diamond (the hardest material on the Earth) and its chemical inertness, etching diamond is a difficult task. Diamonds cannot be etched with chemicals or certain gases, so a plasma is used to etch them.

We are also trying to etch patterns into the diamond. This means that we must have a hard mask (a patterned metal on top of the diamond that transfers the pattern to the diamond during etching) that can withstand the harsh environment. This involves depositing a thin coating (~200 nm) of metal. Once a hard mask is in place, new questions emerge, such as what types of patterns can be created, how large or small can the patterns be, and differences in the etch rate between larger and smaller patterns. Patterned diamond can be used for many applications such as fabricating Micro Electro Mechanical Systems, Atomic Force Microscope tips, or microneedles.

Other projects we work on involve coating materials. We use different materials to coat different substrates. Materials such as Diamond-Like Carbon (DLC) are used on different substrates in order to best take advantage of their specific properties. DLC has a low coefficient of friction and high hardness. It can be used to coat tools in order to reduce wear and tear on the tool from use, hence elongating the life of the tool. AlN is a piezoelectric material that is mechanically deformed when a voltage is applied to it. This property is reversible, meaning that if the material is mechanically deformed a voltage is produced.

Continued on page 2
to network through the engineers that I knew in the "real world."

Months passed and I applied to approximately a dozen jobs. Frustratingly, though, I heard little in response to my resumes and applications. In May, while at Crunchy's, I chatted with an acquaintance from my undergraduate studies at MSU. He had recently started work after a prolonged job search and I asked him if he had any advice. My acquaintance connected me with a recruiting firm. A couple weeks after opening communication with someone from the recruiting firm, I had an on-site interview at Gerdau Macsteel-Monroe. The interview went well, and by the end of June I had a job offer. From my experience, I have a few pieces of advice:

1) **Start your job hunt early!** It took me almost six months to find a job. If not for some luck, it would have taken longer.

2) **Apply often.** Potential future employers have lots of people like yourself looking for a job. Improve your odds by getting your name out there frequently.

3) **Network** Get tips, leads, and simple advice from anyone and everyone. No help, however trivial it may seem, is without value.

Last year, I served as one of the contributors to the graduate student newsletter. However, this year I will not be on the staff because I completed my master's degree in materials science and engineering (MSE) this past summer and have recently started work as a process metallurgist at Gerdau Macsteel. The Monroe, Michigan, plant makes special bar quality steel.

The path to my job was unclear. I began job hunting in January since I anticipated graduating in May. I attended career fairs on campus and subscribed to multiple job-hunting websites. Additionally, I tried deposited material will need to have after deposition.

For more information, please visit the following websites:

- [www.fraunhofer.org](http://www.fraunhofer.org)
- [www.ccl.fraunhofer.org](http://www.ccl.fraunhofer.org)
- [www.ccl-diamond.com](http://www.ccl-diamond.com)

**What is going on in your lab?**

Fellow grad students want to know.

Write 3-4 paragraphs about your lab and we will publish it. Email Lynda White at: whitely@egr.msu.edu.

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**Cont. from page 1—**

A coating of this material can be used to fabricate SAW (Surface Acoustic Wave) devices, which can be used in chemical detectors and as an oscillator.

The interesting aspect of this work is that each material requires its own process for deposition and these processes need to be adjusted (or completely changed) depending on the use of the material and the substrate that is going to be coated. For example, if the substrate has poor adhesion qualities, or it has an odd shape and needs to be uniformly coated; and for the crystalline structure that the
Graduate Student Seminars
A quick list of upcoming seminars offered to help and inform.

Science at the Edge Seminar Series
Friday, October 3 - Audrey Gasch, Laboratory of Genetics and Genome Center of Wisconsin, University of Wisconsin-Madison
Functional Genomics of Yeast Stress Defense

Friday, October 10 - Gary Drobny, Depts. of Chemistry & Physics, University of Washington
Solid State NMR Studies of Proteins at Biomaterial Interfaces

Friday, October 17 - Kevin Plaxco, Dept. of Chemistry and Biochemistry, University of California-Santa Barbara
Better Living through Biosensors

Friday, October 31 - Yan Cui, Dept. of Molecular Sciences, University of Tennessee-Memphis
Gene Expression Trait: A Glimpse into the Black Box of Genotype-Phenotype Mapping

Seminars begin at 11:30 a.m. Fridays (with refreshments served at 11:15 a.m) in Room 1400 Biomedical & Physical Sciences Building. http://www.pa.msu.edu/seminars/edge/

Other Engineering College Seminars:

Research Seminars
http://www.egr.msu.edu/research/seminar-schedule

Biosystems Engineering
http://www.egr.msu.edu/age/news.html

Computer Science and Engineering
http://www.cse.msu.edu/40years/
http://www.cse.msu.edu/?Pg=41&Col=2

Civil and Environmental Engineering
http://www.egr.msu.edu/cee/

Chemical Engineering and Material Science
http://www.chems.msu.edu/seminar.htm

Electrical and Computer Engineering
http://www.egr.msu.edu/ece/Seminar/SeminarDisplay.php

Mechanical Engineering
http://www.egr.msu.edu/me/

Graduate School Workshops—Free for All Graduate Students

Day: Saturday, September 27, 8:45 a.m.– 3:30 pm
Location: Kellogg Center
Planning for a Sustainable Career: From Graduate Student to Professional
This workshop will help graduate students understand work-life balance and practical steps to achieving it plus planning for a sustainable Academic Career.

Day: Wednesday, October 1, 2008, 5:00 – 6:30 PM (Registration to begin at 4:30 PM)
Location: 6 Student Services Building
Developing Your Written Credentials: CV’s, Resume’s, and More!
In developing your written credentials, it is crucial to represent your professional experience, accomplishments, expertise, and qualities in the most impact manner possible. This workshop is designed to help Ph.D. students learn how to present their CV’s, resumes, and cover letters in the strongest possible manner and to provide insight from the perspective of the search committee. Learn what the search committee is looking for and how to write your way into an interview. Participants should bring a copy of their curriculum vitae.
Presenter: Dr. Matt Helm, Director, Ph.D. Career Services

Registration is REQUIRED for all workshops. To register, send an email to: gradwrsp@msu.edu and include ALL of the following information 1) name, 2) department, 3) email Address, 4) name of the workshop, and 5) date of the workshop(s) you wish to attend.

Spartan Engineer Grad News is produced by Graduate Students: Andrew Baczewski, Laura Grabowski, Jenn Ni, and Amanda Portis
Staff: Lynda White, Director of Marketing
GET out of your Lab and help with the newsletter!
The time commitment is whatever you can give.

Email us: gradnews@egr.msu.edu to volunteer or with story ideas.