

Paper University
e-Newsletter:
January/February 2003:
CAREERS!

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FEATURE STORY

PAPER ENGINEERING STUDENTS SAIL TO VICTORY!

Paper sailboats? "Why not?," said engineering students around the country as they began researching, designing, building, testing and re-testing windsurfing sailboards made almost entirely from paper materials for the Energy Challenge 2002 competition last spring. Sponsored by the U.S. Department of Energy and the Institute of Paper Science and Technology (IPST), the event featured a windsurfing competition with a first-place prize of \$15,000 to the team that built the fastest and most energy-efficient sailboard. Designing it was only part of the challenge: the teams also had to race their sailboards across Lake Lanier in Georgia without sinking them!

Seven teams competed for the prize. The winning team from Georgia Tech, composed of mechanical engineering students Gonzalo Stabile (team captain), Philip Timm, and Yianni Ellis, finished ahead of second and third-place teams from Miami University of Ohio and the University of Maine. This was no minor feat. Even though the Tech sailboard, piloted by veteran windsurfer Philip Timm, almost collided with an errant houseboat blocking his way and churning up the water on the lake, it still managed to win two of three races. A few boats had to paddle back to shore after taking on water partway into the race, and another board buckled in the middle and sank in the second race. The Tech sailboard was the only completely recyclable board to make it through the entire day of competition.

Building the boats took an enormous amount of time, energy, and creativity. The Georgia Tech team worked about eight hours a week for four months to create several versions of their sailboard, in addition to keeping up with their rigorous engineering courses for the term. Putting in ten to twelve hours on a Saturday was not unusual for this team. The finished sailboard was 100 percent recyclable, and constructed entirely of paperboard and paperboard tubes, the kind usually used for mailing. Commonly used paper additives were used for finishing and bonding, and the waterproofing came from a recyclable waterproofing product that they used all over the surface of the board. The sail and fins were the only parts not made from paper. They used no power tools in the construction of the board, and used only 3 percent non-paper materials.

Team member Yianni Ellis recalls numerous meetings of the team to consider any and all forces interacting with the boat at various locations on the hull. They used their engineering backgrounds to examine these forces and determine the appropriate shape, materials, and supports to build a competitive boat. Using computer software to model the boat helped them determine the correct shape for their design.



Georgia Tech student Philip Timm testing the team's sailboard in preparation for the Energy Challenge 2002 competition.



This cross-section shows the paperboard and paperboard tubes used in construction of the sailboard.



The team with their board: Philip Timm, Gonzalo Stabile, and Yianni Ellis (left-right)

The team members were both surprised and shocked to place first in the overall competition. They had been so focused on building and racing their “awesome board” that they had not given much thought to the prize money. The team received about half of the \$15,000 prize in the form of scholarships. The rest of the money went to support pulp and paper programs at Georgia Tech.

Now engineering students all over the country are getting ready for Energy Challenge 2003 this spring: *an all-paper hang glider competition!*

For more information on paper boats and the Energy Challenge 2002 Paper Sailboard Competition:

- Tech MEs Sail to \$15,000 Victory
- Georgia Tech Engineering Students to Windsurf Sailboard Made From Paper in Race for \$15,000
- Energy Challenge 2003 – Paper Hang Glider Competition
- Georgia Tech Students Ride the Waves on Paper Sailboard, Win Energy Challenge
- Energy Challenge 2002 – Powerpoint Presentation
- Georgia Tech Team Sails to Win \$15,000 in ‘Paper Board’ Contest – Atlanta Journal-Constitution 04-07-02, page C-1

Meet Kelley Mandracchia, future paper scientist

We hope you will encourage students interested in math and science to consider a career in the pulp and paper industry. The industry is a vital part of our nation’s economy, ranking as the fifth largest manufacturing industry in the country, and a world leader in recycling. Students in many paper science and engineering programs take advantage of paid co-op programs, summer internships, scholarships, and nearly 100 percent job placement with salaries frequently starting at \$50,000 per year for undergraduates. Career choices range from manufacturing, process and design engineering, chemical engineering, project engineering, research and product development, forestry, technical sales and marketing, and many more.

Many people may know little, if anything, about paper manufacturing. We asked Kelley Mandracchia, a senior at North Carolina State University and winner of numerous TAPPI scholarships, what attracted her to the study of paper, and why she is making it her career:

“At first, I didn’t even know the paper industry existed. When I was in high school my dad used to put articles on my bed about careers in chemical engineering. He wanted me to go to college to get a meaningful degree, one that I could get a good job in. I loved chemistry and math, so I said ‘what the heck’ and applied to NC State for engineering. Half way through my senior year of high school, I got a letter from the Pulp and Paper Foundation telling me that if I switched to the Pulp and Paper program I could get two degrees along with a scholarship. I think it took me about five seconds to decide that pulp and paper was the way to go. It was one of the best decisions I have ever made. Where else do you have the chance to work on machines the size of football fields that run upwards of 4,000 feet per minute?

“One of the major reasons I am choosing the paper industry is the people. Everyone I have met has been there to support me and to help me when I’ve needed it. Although the industry is made up of many different companies, it is similar to a large family. And there are lots of jobs available, even in today’s tough economic conditions. At least half of the graduates in NC State’s Pulp and Paper program already had multiple job offers before the first semester was even complete!



The proud Georgia Tech team with their \$15,000 check: Gonzalo Stabile, Philip Timm, Pulp and Paper Engineering Professor Jeffery S. Hsieh, and Yianni Ellis (left-right).



Kelley Mandracchia, TAPPI scholarship winner from NCSU.

"I have already worked for Bowater at their Catawba, South Carolina, mill where they make coated paper and newsprint, and I spent two summers with Kimberly-Clark. The best thing about these jobs was that I was treated as an engineer, and I was not asked to make coffee or run little errands! I was given a great deal of responsibility from the get-go, and was expected to get results. The pay was very good compared to most summer jobs. There were times I was making four times what my friends were making as lifeguards at the local pool; plus, I was advancing my career!

"For students exploring career options, my advice is to just make sure you do something you think you will enjoy, but be realistic. Not everyone can be a marketing agent, journalist, or newscaster. If you are going to college, pick a major that you can get a good job in; it makes life a lot easier after graduation. Be open to change, and try not to turn down opportunities. I hope that you will consider a career in the pulp and paper industry!"

Happy New Year! We in TAPPI's Public Outreach Center would like to wish all our subscribers a happy, healthy and successful New Year. We hope that you enjoy our e-newsletter. If you missed any of our issues, or are a recent subscriber, be sure to check our archives. If you would like to become a subscriber, just fill in your e-mail address here.

Coming in our next issue: Just a few of the 12,000 common and uncommon things we get from trees!

Be sure to try your hand at our riddle from the 15th century, and send in your answers to outreach@tappi.org. The answer to this riddle will appear in our March/April issue.

WHAT AM I?

**I was alive in the forest,
I was cut by the cruel ax,
In life I was silent,
In death I sweetly sing.**

ACTIVITIES

Paper Valentine Heart Basket

Make a valentine heart basket for Valentine's Day! This woven paper craft opens into a small basket for adding candy and small treats for family and friends. This simple version starts with only two sections to weave, but you can add more to make a larger, more intricate design. In contrast to the "over and under" style of traditional weaving, this basket uses the "through and around" method. If your woven heart doesn't make a basket shape, try again or you can always use it as a hanging decoration.

Supplies You Will Need:

- one sheet each of red and white paper – construction paper or card stock work well
- pencil
- scissors
- glue
- ribbon or strip of paper for handle
- treats for filling basket

Here's how:

1. Fold both sheets of paper in half end to end and line up the folded edges of the two sheets of paper. Now cut the sheets in half along the width. You will be using just one of the white halves and one of the red halves to make your heart.
2. Draw a curved line at the top of the unfolded end of the white paper. This will be the top of the heart. Cut along the line through both thicknesses. Place the white piece on top of the red piece, trace the edge, and cut.
3. Cut a slit in the white paper from the center of the folded edge toward the curved edge, cutting almost to the edge. Repeat with red piece.
4. With your pencil, lightly mark the strips on the red paper with X and Y; on the white paper, mark 1 and 2.
5. Hold the red and white papers at an angle with each other.
6. Weave the first red strip (marked X) with the white strips: X goes through 2, then 1 goes through X.
7. Weave the second red strip (marked Y) with the white strips: 2 goes through Y, then Y goes through 1.
8. Pull the papers slightly to tighten the weave.
9. Make sure the basket opens for the treats.
10. Glue the loose edges of the heart together, being sure not to close up the opening. Then attach a handle by gluing the ribbon to the top edges of the heart.
11. Carefully erase numbers and letters from outside of basket.
12. Let dry and fill with treats! Happy Valentine's Day!

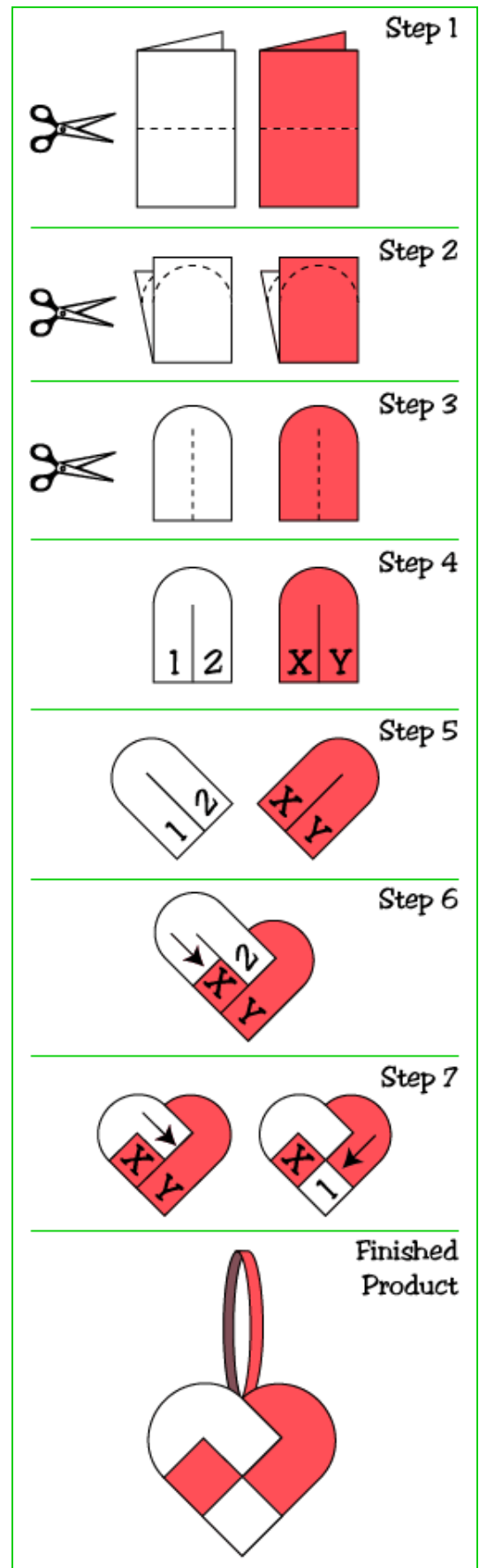
Adapted from:

Woven Valentine Heart Basket

Woven Heart

Heart Basket

Woven Heart – Denmark - Papercrafts Around the World, by Phyllis and Noel Fiarotta, Sterling Publishing Co., Inc., New York



NEWS



Be sure to mark your calendars for National Engineers Week, February 16-22, 2003. **The New Faces of Engineering** is a new program that encourages students, especially women and underrepresented minorities, to consider engineering as a career. It also spotlights the outstanding contributions of America's youngest professional engineers.



With the goal of expanding the ranks of future engineers, National Engineers Week features a number of creative programs for students. Zoom into Engineering teams volunteer engineers with elementary school students, and Introduce a Girl to Engineering Day has given millions of girls a chance to experience engineering firsthand.

The Future City Competition, now in its 11th year, challenges middle school students to design and build the cities of tomorrow. This innovative program has reached more than 30,000 middle school students from 950 schools, and is one of the nation's largest and most successful engineering outreach programs. Students, working with teachers and volunteer engineers, build computer and 3-D scale model cities, and then defend their designs before a panel of engineer judges at the competition.



The Sightseers Guide to Engineering interactive map project, created by the National Society of Professional Engineers, celebrates engineering sites and landmarks in all 50 states. This is an outstanding tool to identify field trips and enrich your travels and family vacations. In addition, the Discover Engineering Online outreach program provides materials and programs to both students and engineers who visit classrooms.

For more information, visit the National Engineers Week web site at: www.eweek.org.

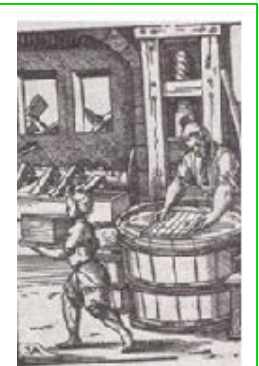
QUESTION OF THE MONTH?

Q: I'm a student and my exploratory class is studying careers. I have to do the paper industry. It has to be two pages long, and working to make paper doesn't sound like much fun, pretty boring really. Can you give me some info for my report?

A: You would be amazed at how much fun papermakers have! Perhaps, having read about the life of papermakers in the 1700s, you have formed an erroneous perception of papermaking. Indeed, in the early days when paper was made entirely by hand, papermakers worked in dark, damp and gloomy mills, and you could always spot an old papermaker in the village. His beefy arms and hands were always red and very muscular from continually being in and out of hot water, and his back was stooped from years of bending and leaning over the dipping vat of water. Working twelve hours a day under such rugged conditions required exceptional strength and a robust constitution!

You will be relieved to know that today, the 700 pounds of paper consumed each year by every person in America is not produced this way! Even though the basic paper "formula" has remained the same, papermaking is now a modern, automated, and highly technical industry employing highly skilled men and women.

Be sure to check out Paper U's When I Grow Up section for the Paper U paper industry career brochure as well as the engineering students' stories featured in this issue. For information on the early days of papermaking, see Papermaking: The History and Technique of an Ancient Craft, by Dard Hunter, NY, Alfred A. Knopf, 1943.



Woodcut by Jost Amman [1568] is the earliest picture of papermaking. (from *Papermaking: the history and technique of an ancient craft*, Dard Hunter, NY, Knopf, 1943)

Here are some other links for more information about careers in the paper industry:

- Pulp and Paper Job Opportunities
- Paper Science and Engineering – Frequently Asked Questions
- What Do Chemical Engineers Do?
- The Modern Paper Mill
- Why Choose a Career in Forest Products?
- Forest Products Careers

We hope that this information is useful to you. Good luck with your project!



In the modern paper mill, each roll of paper can weigh several tons. (Photo courtesy of Wisconsin Paper Council)

RESOURCES

Paper Boats

Ken's Paper Boat Page contains information on the unusual topic of paper boat technology.
<http://www.home.eznet.net/~kcupery/index.html>

In 1874, Nathaniel H. Bishop left Troy, New York, in a 58-pound paper canoe, bound for the Gulf of Mexico. Read his fascinating tale at <http://www.rtpnet.org/robroy/paperc/intro.html>

Paper Industry Careers

Be sure to direct students to our guide to paper industry careers at http://www.tappi.org/paperu/grow_up/greatCareer.htm. Included are the various technical positions available in the industry, and recommended course of study for each job.

There are some great web sites sponsored by colleges and universities where students can explore the various career opportunities in the paper industry. Here are just a few:

- SUNY Paper Science and Engineering Department: <http://www.esf.edu/pse/scholarships/careers.htm>
- Georgia Institute of Technology Pulp and Paper Engineering Program: <http://www.chemse.gatech.edu/~pulpaper/>
- University of Maine Department of Chemical Engineering: <http://www.umecheme.maine.edu/che/info.htm>
- University of Minnesota's College of Natural Resources: <http://www.cnr.umn.edu/careers/careerchart.php>

Valentine's Day

Here are two sites devoted to Valentine's Day. Read about the history of this very special holiday at

Valentine Be Mine <http://www.techdirect.com/valentine/index.html> and the History Channel at <http://www.historychannel.com/exhibits/valentine/>.

ENGINEER JOKES

You Might Be an Engineer if...

- your favorite James Bond character is “Q”.
- your family hasn’t the foggiest idea what you do at work.
- in college you thought Spring Break was metal fatigue failure.
- you have modified your can-opener to be microprocessor driven.
- you think the real heroes of “Apollo 13” were the mission controllers.
- you take a cruise so you can go on a personal tour of the engine room.
- you have owned a calculator with no equal key and know what RPN stands for.
- you make four sets of drawings (with seven revisions) before making a bird bath.
- you have trouble writing anything unless the paper has horizontal and vertical lines.
- your ideal evening consists of fast-forwarding through the latest sci-fi movie looking for technical inaccuracies.
- you think the value of a book is directly proportionate to the number of tables, charts and graphs it contains.

Q. How many first year engineering students does it take to change a light bulb?

A. None. That’s a second year subject.

Q. How many civil engineers does it take to change a light bulb?

A. Two. One to do it and one to steady the chandelier.

Q. How many electrical engineers does it take to change a light bulb?

A. None. They simply redefine darkness as the industry standard.

Q. How many computer engineers does it take to change a light bulb?

A. “Why bother? The socket will be obsolete in six months anyway.”

Q. How many mechanical engineers does it take to change a light bulb?

A. Five. One to decide which way the bulb ought to turn, one to calculate the force required, one to design a tool with which to turn the bulb, one to design a comfortable - but functional - hand grip, and one to use all this equipment.



From Profession Jokes – Engineers - <http://www.workjoke.com/projoke27.htm>

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Jan./Feb. 2002: Books and Libraries

Mar./Apr. 2002: Earth Day 2002

Sep./Oct. 2002: Back to School!

Nov./Dec. 2002: Forest Products for the Holidays

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