

STEM Society Meeting, August 14, 2012

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1 About the STEM Society and the STEM Society Website

STEM is an abbreviation for Science, Technology, Engineering and Mathematics. There are nearly 100 people on the mailing list, although a much smaller group attends any one meeting. We meet on the second Tuesday of each month at the Trailside Center at 99th and Holmes in Kansas City, Missouri. The meetings are open to all. The start time is 6PM. We make presentations, have discussions, and sometimes have scientific demonstrations. The topics range from General Relativity to scientific experiments for kids.

The set of meeting notes may be viewed by going down the list of notes appearing on the front page of the site. These notes contains links to documents, which may be viewed or downloaded by clicking the link. Other documents can be reached by clicking the heading "Documents and Downloads" that appears on the left side of the front page. Then click on "documents." The meeting notes may also be viewed in an archive file in the list of documents. Most of the documents are PDF files. They may be viewed or downloaded to the computer by clicking, provided Adobe Reader is present, or another program capable of reading PDF files. There are often more documents available at the site than are listed under "Documents" because they may not have been added to the documents.htm file yet.

The web site is:

<http://www.stem2.org/>

Direct to the documents list:

<http://www.stem2.org/je/documents.htm>

Direct to the archive file:

<http://www.stem2.org/je/archive.pdf>

2 The August Meeting Announcement

The August meeting of the STEM Society will take place on the second Tuesday of the month, August 14, 2012, at the Trailside Center at 99th and Holmes in Kansas City, Missouri. The starting time is 6PM.

Possible Topics are:

- (1) An Introduction to Projective Geometry. Projective geometry has application to various parts of applied mathematics, for example areas such as computational geometry and the solution of partial differential equations using the finite element method.
- (2) Electronics and microcontroller projects.
- (3) Some Available Biological Laboratory Equipment.

- (4) Surprise Contributions by Members: Talks, Demonstrations, Apparatus, et cetera.
- (5) Book Reports.
- (6) Scientific Computer Programs.

3 Projective Geometry and Barycentric Coordinates

A reference for this discussion is **Projective Space and Screen Mapping** by James Emery.

<http://www.stem2.org/je/projectivespace.pdf>

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1	Introduction	1
2	Projective Space	2
2.1	Computations With Two Dimensional Straight Lines, Homogeneous Coordinates	2
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3.1 Other Documents Related to Projective Space by James Emery

[1] Emery James D, **Computer Graphics and Geometry.**

<http://www.stem2.org/je/graphics.pdf>

[2] Emery James D **Conics, Quadrics and Projective Space.**

<http://www.stem2.org/je/quadric.pdf>

[3] Emery James D, **A Finite Element Current Flow Program.**

[4] Emery James D, **Projective Space.**

<http://www.stem2.org/je/projsp.pdf>

[5] Emery James D, **Projective space, Quadric surfaces, Conics And Rational Curves.**

<http://www.stem2.org/je/rational.pdf>

[6] Emery James D, **The Simplex and Barycentric Coordinates.**

<http://www.stem2.org/je/barycentric.pdf>

[7] Emery James D, **Tolerancing and Geometric Design.**

<http://www.stem2.org/je/tgd.pdf>

[8] Emery James D, **Conics.**

<http://www.stem2.org/je/conics.pdf>

4 Rich Kaufman: KCP&L Smart Grid Project

A smart grid contains advanced technology that enables enhanced, two-way communication between a utility and its customers. The resulting information provides customers with:

Tools to help manage their energy Improved energy efficiency Improved reliability (fewer outages) The opportunity to sell back to the grid power generated through renewable generation sources

KCP&L believes this project will serve as a blueprint for future smart grid implementation and will accelerate a realization that the "utility of the future" safely delivers reliable electricity with greater efficiency and improved environmental performance.

Why KCP&L SmartGrid?

Through the SmartGrid Project, KCP&L will gain knowledge about customer needs and usage patterns. In addition, the company will be able to gather information about smart grids storage capabilities, supply and delivery.

The SmartGrid demonstration improvements will enhance service for the entire Midtown area through improved service reliability, reduced energy delivery costs, more efficient energy consumption, an improved carbon footprint and better information flow.

A SmartGrid Demonstration Project is located at 47th and Troost. There is a semitrailer truck there, which is essentially a giant Lithium Hydride Battery. We should find the details about solar panels and about feeding power back into the grid, giving needed hardware and so on.

<http://www.kcplsmartgrid.com/>

5 Book Reports

Knocking on Heavens Door, Lisa Randall.

This book is an up-to-date book on Particle Physics written for the lay audience, but with some insider technical details and a very good introduction to what science is and is not. The book is available at Linda Hall Library.

The Mathematics of Life, Ian Stewart.

This book by a mathematician is a popular science work, but gives information that other such books do not. There is some insight on how DNA is sequenced, how the the molecule is broken up into pieces, each piece sequenced, and stored, then using matching of overlapping sequences, each piece joined to its correct adjacent piece using the computer, to finally assemble the entire molecule in sequence. There is material on DNA, on Fibonacci numbers and phyllotaxis, on knots and folds, and on genetics and such. The

book is available at Linda Hall Library.

Physics Demonstrations Julien Clinton Sprout.

Sprout is a Physics professor at the University of Wisconsin and has done these demonstrations for years in connection with his popular lecture series. There are two DVD videos that come with the book. The book has a section for each demonstration with references. Another version of his demonstrations is available in a YouTube video. The book is available at Linda Hall Library.

6 Maurice Smith: Ruskin High School Academy of Engineering

<http://ruskinmathachievers.wetpaint.com/>