

STEM Society Meeting, September 9, 2014

James Emery

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1 About the STEM Society and the STEM Society Website

STEM is an abbreviation for Science, Technology, Engineering and Mathematics. The acronym STEM is commonly associated with K-12 education, but our use of the term is only slightly bound to this meaning. There are

over one hundred 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 have demonstration experiments. These relate to Science, the History of Science, Mathematics, Engineering, Philosophy and Technology at all levels. The topics have ranged from a technical discussion of the mathematics of General Relativity to scientific experiments for young students.

These meeting notes contain links to many other documents, which may be viewed or downloaded by clicking the link. A partial list of documents can be reached by clicking the heading **Documents**. The meeting notes may also be viewed in an archive file (archive.pdf), which is in the list of documents. Many of the documents are PDF files. They may be viewed or downloaded to the computer by clicking, provided Adobe Reader, or another program capable of reading PDF files, is present. There are many more documents available at the site than are listed under **Documents** because the documents.htm file is not at all up to date. The last time I checked, about March 2014, there were about 350 document files on the site. We are in the process of creating better techniques for finding documents and authors. The first meeting of the STEM Society was in November of 2006. For several years we used the content management program called Joomla. It had a fancy looking interface, but was hard to use. It overran the space somehow at our internet provider Bluehost. So we now have a very simple HTML site. It is not so slick looking as Joomla, but very easy to maintain and modify.

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 September Meeting Announcement

The September meeting of the STEM Society will take place on the second Tuesday of the month, September 9, 2014, at the Trailside Center at 99th and Holmes in Kansas City, Missouri. The starting time is 6PM.

Here are some possible topics (We will probably cover only some of them):

(1) Greg Hodes will discuss Roger Penrose and his attempt to define human consciousness using Quantum Mechanics.

It used to be thought that the lower animals do not have consciousness. This makes us more comfortable in eating meat. And prevents a giant monkey wrench being embedded in the machinery of traditional religions. Most scientists now recognize that animals do have some form of consciousness, what ever that is. But this probably does not include bacteria or plants, so mowing the lawn is OK, although probably a waste of time.

Recall that Chris Samuelson gave, several months back, a nice review and outline of Penrose's book called **The Road to Reality**. This is a rather serious book on Physics and the tools of Differential Geometry applied to Physics. Leon Dixon also plowed through this book and might comment.

(2) Kent Smith has downloaded an interesting book on programming the Android computers, (cell phones and such), to send out radio signals, to do such things as read tags on say drug bottles and such. This also applies to the Raspberry Pi and the Arduino. Kent will discuss and give a demo.

(3) We have accumulated many documents on our website since our first meeting in November of 2006. I have been working on tools for locating and searching the topics and authors on the website. I shall talk about these tools and how to use them. In the process of doing this, I have found many interesting things that I had forgotten about. So we may review some of these things.

(4) If time permits, we can present other recent projects in Physics, Mathematics, and Engineering. I think it is good to also present some relatively simple problems as an educational review, or as an introduction for those unfamiliar with the problems.

(5) We shall likely discuss some books.

(6) I hope there will be some surprise projects and topics also. You can contact me about any such topics, or just spring them upon us at the meeting.

The STEM Society Website:

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

3 Greg Hodes. Roger Penrose, Quantum Mechanics and Consciousness

Roger Penrose argues that consciousness, or certain conscious operations, are not computable and, therefore, that the roots of consciousness must be found in the brain at the quantum level, much of which is non-computable. He has a version of the halting problem which he says proves the first claim. I have a short, fairly simply version of Penrose's proof.

Power Point Slides Titled:

Mind, Matter, Meta-Mathematics, Computability: Euclid and The Lying Cretan to Penrose

Reference: Penrose Roger, **Shadows of the Mind**

4 Kent Smith, Near Field Communications

Kent Smith has downloaded a free book, which shows how to write programs to work with NFC, to read tags, similar to bar codes, on objects. He demonstrated this by reading tags on drug containers. He purchased the tags for the demo. Here is the book:

Tom Igoe, Don Coleman, Brian Jepson, **Beginning NFC: Near Field Communication with Arduino, Android, and PhoneGap** O'Reilly.

Book Description:

”Jump into the world of Near Field Communications (NFC), the fast-growing technology that lets devices in close proximity exchange data, using radio signals. With lots of examples, sample code, exercises, and step-by-step projects, this hands-on guide shows you how to build NFC applications for Android, the Arduino microcontroller, and embedded Linux devices.

You’ll learn how to write apps using the NFC Data Exchange Format (NDEF) in PhoneGap, Arduino, and node.js that help devices read messages from passive NFC tags and exchange data with other NFC-enabled devices. If you know HTML and JavaScript, you’re ready to start with NFC.”

5 Rich Kaufman, Paul Erdős, and Claude Shannon

From: richkaufmanpv@hotmail.com

To: jdemery@member.ams.org

Dear Jim,

I’ve been reading a book on the history of the development of computers.

It discusses Paul Erdős’ unprovability theorem and Turing’s paper on the non-computability of some numbers. I’m not really sure I get Erdos’ reasoning. At this point in my life, I don’t feel like struggling to understand something, but it would be good to do so.

If you feel like being a teacher, maybe you can simplify these ideas enough to explain them to a lazy guy.

Regards,

Rich

P.S. I also have never understood Claude Shannon’s reasoning.

C. E. Shannon: A mathematical theory of communication. Bell System Technical Journal

6 Paul Erdős, ”My Brain is Open, Let n be an Integer”

”Paul Erdős, one of the greatest mathematicians of the twentieth century, and certainly the most eccentric, was internationally recognized as a prodigy by age seventeen. Hungarian-born Erds Erdős believed that the meaning of life was to prove and conjecture. His work in the United States and all over

the world has earned him the titles of the century's leading number theorist and the most prolific mathematician who ever lived. Erdős's important work has proved pivotal to the development of computer science, and his unique personality makes him an unforgettable character in the world of mathematics. Incapable of the smallest of household tasks and having no permanent home or job, he was sustained by the generosity of colleagues and by his own belief in the beauty of numbers. Witty and filled with the sort of mathematical puzzles that intrigued Erds and continue to fascinate mathematicians today, My Brain Is Open is the story of this strange genius and a journey in his footsteps through the world of mathematics, where universal truths await discovery like hidden treasures and where brilliant proofs are poetry."

7 Claude Shannon, Information Theory

Question: What is the connection between Thermodynamics and Information Theory?

Answer: Later perhaps.

8 Ambrose Wolf, Schrödinger's Cat On Film

Schrödinger's cat caught on quantum film - physics-math - 27 August 2014
- New Scientist 9/8/14

From: awolf@kcp.com
To: jdemery@member.ams.org;
Hey Jim,

I pretty much never can make the meetings, due to family constraints, but check out the attached on quantum entanglement - kind of cool, can also boggle your mind. :)

Say 'Hi' to Bob Williams for me.
Ambrose

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Schrödinger's cat caught on quantum film - physics-math - 27 August 2014 - New Scientist 9/8/14

schrodingercat.pdf

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