

STEM Society Meeting, June 13, 2017

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.

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 June 13, 2017 Meeting Announcement

The June meeting of the STEM Society will take place on the second Tuesday of the month, June 13, 2017, at the Trailside Center at 99th and Holmes in Kansas City, Missouri. The starting time is 6PM. Also look at our website for past meeting notes:

The web site is:

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

Possible Topics and Discussions:

(a) James Emery: We will look at and discuss ideas from Relativity. This will be mostly special relativity. It is a bit hard to decide what to talk about in

this area: about deriving equations, history, or maybe, working some simple problems. We have presented material in this area a few times before. These meetings began in late 2006, and already in the spring of 2007, I gave a talk on this subject, presenting a power point presentation on both special and general relativity.

I came across an interesting new book on General Relativity at Linda Hall Library recently:

[1] Prasanna A R, **Gravitation**. CRC Press, 2017, LHL QC178 .P74, (Relativity).

There is an interesting forward to the book by Marek A. Abramowicz of Göteborg University, who says, "One should forcefully stress that the mathematics of Einstein's theory of general relativity is not at all simple. It demands from those studying it, a solid background in tensor calculus, differential geometry, and classical dynamics, but also other spiritual virtues, a true scientific curiosity, dedication and patience; some say that 10,000 hours of studies are necessary to become an expert in any field of general relativity."

I am a bit short of the 10,000 hours, and although I have a fairly good knowledge of the background mathematics, and like theoretical derivation of equations, I have definitely not worked nearly enough practical calculation problems, which are required to gain intuition for this subject, which we don't naturally experience and don't obtain in ordinary life. Although some of us may have learned some gravity by falling off of a building, few have been drawn through a black hole, and returned to tell about it.

I have a copy of my 2007 slide presentation, but these slides were no doubt accompanied by quite a few words, which I don't quite remember exactly now.

So just in the last day or so I decided I should try and to find some simple calculation problems to go over.

(b) James Emery: Experimental Mathematics. Last meeting we discussed some experimental mathematics and I presented a challenge to provide a formal proof of an interesting technique for "proving" the Pythagorean theorem by plotting and paper cutting. So we might spend a brief amount of time on this.

(c) As always improvisational contributions by walk-ins are welcome.

3 Relativity Discussion

A recent document supporting this discussion on relativity is by James Emery, and titled **Special Relativity**:

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

I will probably add more to this document in the future.

Previous documents on relativity:

The following document is a pdf version of the power point slides presented in 2007,

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

This second document is related to the first giving some details not in the slides. This is originally from the same time as the first, but has been edited and perhaps added to over time.

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

Charley Montesana said that he had been reading a book by Max Born on relativity:

[1] Born Max, **Einstein's Theory of Relativity**, revised edition, Dover 1962, with the collaboration of Güther Leibfried and Walter Biem.

According to the preface by Born in this revised edition, the original German edition was published in 1920, and an English edition followed in 1924.

Max Born was one of the originators of the theory of Quantum Mechanics, and won the Nobel prize in connection with this work. When the Nazi's came to power in 1933, Born emigrated to Great Britain.

Born had an unbelievable set of famous students and assistants at Göttingen. Born lived from 1883 to 1970.

I said that Born was the grandfather or greatgrandfather of a famous modern actress. "Who was the actress actress who starred in the rock movie that took place in the concrete lined Los Angeles river (which I knew as the flood control when I lived near it in the Los Angeles area), and which featured a hotrod race in the river? Someone came up with the movie "Grease," and the actress Olivia Newton John. I said right!. But then I wondered out loud if I remembered this correctly, and if so, was she the granddaughter or greatgranddaughter? Irene Starr checked during the meeting, on the internet, and found that Olivia is indeed the granddaughter of Max Born. I also was informed that Olivia Newton John is from Australia, which I did not know. There must be a story there.

4 Further Information From Irene Starr

From Irene Starr, To Jim Emery

June 14, 2017

<http://channel.nationalgeographic.com/genius/> is the site for the program I mentioned last night 06/13/2017 about Einstein's life. I left early so I could watch episode 8. The last 2 episodes are next week and previous ones seem to be online.

Irene

In last months notes, I presented some information about Norton and Irene Starr. Irene sent me an email correcting some of my information, and adding some more quite interesting facts. Here is her email:

Irene starr@umass.edu

Jun 9 at 2:30 PM

To jdemery1@yahoo.com

Hi Jim and thanks for sending the notes. FYI, below are some details on your thoughtful section 5 comments. No need to change anything unless you

wish.

Pictures of puzzles and more are at

<http://puzzleworld.org/PuzzleWorld/cat/category.htm>.

www.amherst.edu/nstarr/ is Norton's website.

I taught physics, moved into media in the late 1970s, and into tech management at UMass Amherst 1989-2002 (an interesting time with all the tech changes), and retired to a part-time math teaching position at a community college. Also in retirement I was the project manager for the STEM Ed Inst at UMass for over a year (including a science day for 800 students). I'm not a puzzle solver or creator, but help with logistics and enjoy the travel to puzzle conferences which have been as far away as Australia and as near as Boston (when we lived in Amherst).

Hope to attend the meeting.

Take care, Irene