

STEM Society Meeting, August 12, 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 which is 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 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.

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 12, 2014, at the Trailside Center at 99th and Holmes in Kansas City, Missouri. The starting time is 6PM.

Possible topics are:

(1) Larry Marsh is an Econometrician. He will talk about a Regression Analysis of time series data relating to the attempt of the Federal Reserve System, through monthly purchase of treasury bonds (85 billion dollars per month), to control the money supply and interest rates. This is called Quantitative

Easing. The Fed buys bonds and securities from member banks. These assets are deposited in the Fed as part of the required reserves of the member banks. The banks are paid in Federal Reserve Notes which are created by the Federal Reserve System (the Federal Reserve Creates Money and serves the same function as the discovery of gold mines in the olden days of the gold standard). The member banks then have their previous reserves freed, as well as the new Federal Reserve notes. This increases the money supply and thus lowers interest rates. The idea is that this lower interest rate will spur economic development.

(2) We shall likely have some book reports.

(3) Perhaps there will be some surprise projects and topics. 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 Larry Marsh, Time Series Regression Analysis

Larry talked about Economics and Econometrics in general and his following description:

”Artificial intelligence basically breaks down into two schools of thought: (1) expert systems, and (2) pattern recognition (neural nets, ARIMA or VAR models, et cetera). Researchers frequently combine pattern recognition and expert systems together in a single model, but really only the expert systems part gives us the insight we need to sort out which policies are working and which are not working. This is because the presence of lagged dependent variables on the right side of equation serve as a black box (pattern recognition) that disguises the effect of the expert systems variables. This paper shows how to translate the pattern recognition part back into expert systems. I call this paper the jelly doughnut paper, even though there is nothing in it about jelly doughnuts. (It is about the Fed stress testing the banks and buying \$85 billion worth of bonds each month (previously).) But people can relate better when talking about how eating a jelly doughnut every day will affect their weight. The usual regression coefficient only tells us how a one-unit one-time

change in an exogenous variable (the jelly doughnut) affects one's weight. The right-hand lagged dependent variables on the right side of the equation can be converted to lagged exogenous variables by interactive substitution. But the important contribution of the paper (which I am just now typing into the paper) is how to test for the significance of a long term policy (e.g. what is the effect of eating a jelly doughnut every day from now on.). The derivation of the hypothesis testing part requires converting from rectangular to polar coordinates and integrating out the distance measure, r , which leaves only the angle to test. If the ratio of regression coefficients indicating the long term policy effect is statistically significant, then the corresponding angle will be statistically significantly greater than zero.

Lots of fun! I hope that people will be candid and point out any errors or aspects that can be improved.”

Larry presented power point slides illustrating his paper. Since he plans to publish this paper, we can not print a copy of his slides or his paper here yet. He plans to present the material to a medical statistics group, and at a national meeting of Econometricians. The paper is intended to correct some errors in analysis published by the San Francisco Federal Reserve Bank.

Perhaps we can print a copy of his presentation later after publication.

4 **Greg Hodes. Roger Penrose, Quantum Mechanics and Consciousness**

Jim,

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 that I'll bring Tuesday, should anyone be interested.

Greg

Greg is to talk about this at the September meeting.

5 Crime Lab Tour

I found out, conversationally, that Johnson County has a newly opened, state-of-the-art Crime Lab (google it.....pretty interesting the range of stuff they analyze.....how does any crime ever go unsolved ?)

It would be great to invite someone from there to give a talk on some of the stuff they do. It would be even greater to get a tour of the place.

Rich

6 Iron Dome Missile Shield

Jim,

Any interest in discussing the success or failure of the American-supplied Iron Dome missile interceptor system. An MIT professor, whose name I can't remember, says the success is only when there is a head-on trajectory with incoming rockets leading to a 5 percent success rate. The Israelis say the success rate is much higher. //

This requires computation to ascertain the validity of these claims.

Rich

P.S. these systems are manufactured by Raytheon of Boston, a huge company. They stand to make lots of money from these systems which the US is supplying to Israel.

7 Books Mentioned:

Money, Blood and Revolution: How Darwin and the Doctor of King Charles I Could Turn Economics Into a Science, George Cooper.

Book Review: **The Remedy**, Thomas Goetz. Hungry for exposure, in 1890, the creator of Sherlock Holmes traveled to Berlin to write about a much-hyped cure for tuberculosis.

Review by William Bynum, April 8, 2014 6:26 p.m. ET. The subtitle of Thomas Goetz's **The Remedy: Robert Koch, Arthur Conan Doyle and the Quest to Cure Tuberculosis** highlights two famous doctors, the former a German, the latter an Englishman.

The Mystery of Consciousness, John R Searle.

Chalmers, **The Hard Problem of Consciousness**.

Book Review: **The Zero Marginal Cost Society**, Jeremy Rifkin By pfaulhaber, BLOGCRITICS.ORG Published 10:00 pm, Sunday, March 30, 2014

A new book by Jeremy Rifkin, **The Zero Marginal Cost Society: The Internet of Things, the Collaborative Commons, and the Eclipse of Capitalism**, suggests that within the next few decades, consumers are going to start living in an era where many goods and services are free.

Free Energy. Rifkin writes, "But what if I were to say to you that 25 years from now, the bulk of the energy you use to heat your home and run your appliances, power your business, drive your vehicle, and operate every part of the global economy will likewise be free?"

Rifkin surmises that events starting with free downloads of music back in 1999 and continuing with the decline of newspapers and book publishing will expand into almost every aspect of our lives and destroy capitalism as we know it today. Emerging technologies such as the Internet of Things (IoT) and 3-D printers, free online education and open-source software are going to change the world and how commerce is conducted.

Rifkin a few years back wrote a book called **The End of Work**. This book is about the fact that through the development of technology and machines, most production is done by automated equipment and large industrial automated machines. And there will not be work for people and so no income in the future. Thus the society will have to change to provide income somehow. The idea that one gets ahead by hard work, and people are poor because they don't work hard, has been nonsense for a very long time. Poverty, is due to many things, but people throughout the world who do things like carry a 50 gallon barrel of water up from the river 10 Kilometers each day, on their head, certainly can not be accused of not working hard. The key to wealth is energy, which comes ultimately from the sun. The energy produced by people is quite small. We hear all the time how "productivity" of workers is increasing. It is the productivity of machines that is increasing. And this includes also intellectual work. And this energy and technology has not been produced by billionaires such as Warren Buffet and the Koch Brothers

working hard.

Capital in the Twenty-First Century Thomas Piketty

The Price of Inequality, Joseph E. Stiglitz