

VALLEY ENGINEERING, SCIENCE & TECHNOLOGY CLUB

www.engineersaz.com

MAY 2016 NEWSLETTER

Editor: Noelle Jobson

The Engineers Club is a social organization which meets regularly for lunch with a speaker on a technical topic. Spouses are invited and many attend regularly. Short field trips are occasionally scheduled. Membership is open to anyone who has worked in or related to the engineering or scientific fields. Meetings are held at 11:30am on the first Friday of each month (unless otherwise noted), October through June, at Briarwood Country Club, 135th and Meeker in Sun City West, AZ

Visitors are always welcome -- just call Reservations at (623)546-9112 to let us know you are coming.

May 6 PROGRAM

Collaborative consumption. How Technology is Enabling the New Marketplace Economy

Joe Dunnigan, CEO, Swappow



The oldest known civilized form of commerce appears to have been barter. Barter predates all other forms of commerce and currency. Barter was necessary for survival and basic human needs and it was based on basic economic principles of supply and demand.

Today, in an ever expanding and highly consumer driven society, we are facing the largest inventory of supply and, at the same time, the greatest demand in history. Billions more people means billions more products which leads to billions more consumers. This, of course, creates both a problem and an opportunity. The problem is that our resources are not infinite. The opportunity is to do more with what we already have.

The good news is that now, in ways that have never before been possible, technology is enabling a powerful solution. One which brings people together to do what we call "WE commerce".

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June 3 PROGRAM

Enabling Autonomy: A New Approach to Mission & Safety-Critical Control Systems Engineering

Noelle Jobson, CEO & Founder, IGM Consultants, LLC



The three most compelling systems engineering challenges and market growth constraints to safe, robust, reliable and cost-effective deployment of autonomous systems vehicles are lack of operator trust, the "big data" problem, and lack of regulatory standards and guidelines defining "safe" and certifiable large-scale deployment of stochastic, non-deterministic decision making systems in a seemingly unbound operational environment.

Cloud computing, smart, distributed sensors, and data collection and management innovations have opened up enormous opportunity to roll out autonomous vehicles more cost-effectively and faster than ever.

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NOTES FROM ...

President Jackie Rice

Homo Neandertalensis and Homo Sapiens



Humans appear to have inherited several traits related to skin, hair and some autoimmune diseases from Neandertal ancestors. Two independent investigations identify for the first time the specific parts of the human genome that seem to have been most affected by Stone Age interbreeding with Neandertals. The research locates part of Neandertals' legacy in sections of present-day Europeans' and East Asians' DNA that are stocked with genes influencing the production of keratin, a key substance in skin, hair and nails, that must have aided survival outside of Africa.

Neandertals DNA contributions to modern humans also encompass genes related to several medical conditions, including lupus and Crohn's disease.

Neandertals lived in Europe and Asia between around 200,000 and 30,000 years ago. Previous studies estimated that 1 to 3% of non-Africans' DNA today comes from Neandertals, while present-day Africans have little or no Neandertal ancestry. In a new study, about 20 % of the Neandertal genome shows up in various places in the DNA of living Europeans and East Asians.

In an analysis of 379 Europeans and 286 East Asians they identified unusually long chains of gene variants that people probably inherited via Stone Age interbreeding, presumably from Neandertals. These Neandertal hot spots did not appear in the DNA of West Africans.

The patterns of Neandertal DNA found in the human genome suggest that ancient populations interbred at least twice across Europe and Asia. " Still, large swaths of Europeans' and East Asians' genomes contain unexpectedly little Neandertal DNA. These regions potentially are a road map to finding genes that make us human."

FUTURE MEETINGS

October 7, 2016

Title: Additive Manufacturing in Aerospace and Defense
Speaker: Dhruv Bhate, PhD, Senior Technologist for Additive
Manufacturing
Phoenix Analysis and Design Technologies (PADT)

For more information on our speakers, please visit our website at

www.engineersaz.com

The slides are located under the meeting speaker section.

2016 OFFICERS

President	Dr. Jackie Rice	623-572-8089
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Field Trips	Lanny Barness	623-546-3364
Hospitality	Doris Palmer	623-815-8143

TREASURER'S REPORT May 2016

General Fund Balance: \$5496.03
Scholarship Fund Balance: \$5509.42

Lottery Winner is Don Thunborg \$83
Lottery Contribution to Scholarship Fund \$83

LUNCHEON MENUS

May 6: #1 Chicken Pot Pie, or #2 Baked Cod.
 Both are served with Salad, Saffron Rice, Peas & Carrots, & Peppermint Ice Cream with Cookie.

June 3: #1 Pork Cordon Bleu or #2 Grilled Salmon. Both entrées come with Salad, Au Gratin Potatoes, Green Bean Almondine, & Ice cream with rolled cookie.

(Grilled Vegetable Plate or Fruit Plate also available).

RESERVATION POLICY

The cost of the monthly luncheon is \$18.00 cash or check.
 The reservation deadline is 6PM Monday before the meeting.
Late reservations cannot be guaranteed the regular meal.
 Call Dave Whitehouse to cancel your reservation.
 Note that the full cost of the luncheon will be charged for "no-shows" and cancellations after 5PM on Wednesday before the meeting.
 Please have cash or make out your check in advance.
RESERVATIONS Dave Whitehouse (623) 544-0942

Joe Dunnigan Cont'd

Today, everyone has the potential to be their own business and technology is allowing commerce to happen in a Peer-To-Peer manner versus what has historically required a variety of middlemen.

Our new marketplace economy is driven by trust, communication, mobility and emotion in a way that is strikingly similar to the olden days of barter.

In our presentation, we will explore current and emerging trends in what is the marketplace economy. We will discuss what is driving it, what is enabling it and discuss what implications it may have on our future – both socially, environmentally and economically.

BRINGING GENERAL RELATIVITY DOWN TO EARTH

General Relativity most often reveals itself on cosmological scales, but its effects also show up closer to home – even in our pockets. The GPS that so many smart phones use to orient and guide users would be useless if the system did not account for relativity.

According to general relativity time slows in a gravitational field; as a result clocks closer to a gravitational mass run slower than those farther from it – an effect known as time dilation. Time dilation results in a subtle reddening of light moving up from earth's surface, as the weakening gravity causes the light's electromagnetic fields to oscillate at a lower frequency.

In 1977 scientists laying the foundation for GPS navigation confirmed the underlying effect, time dilation, by launching a satellite with a highly precise cesium clock. As expected, the clock quickly went out-of-sync with its earth-bound counterparts, in agreement with Albert Einstein's theory.

For GPS to function, clocks on satellites and on the ground have to stay in-sync, allowing your smart phone to measure the exact travel time of radio signals from multiple satellites. The relative timing of the signals allows the phone's GPS receiver to calculate position. If engineers failed to account for gravity's time dilation, the weaker gravity in orbit would nudge the clock in each GPS satellite ahead of ground-based clocks by tens of microseconds per day, an error that would quickly make the navigational system useless.

(from Science magazine March 2015)

Noelle Jobson Cont'd

However, incumbent industry leaders are too constrained by their inculcated processes, culture, and revenue stream dependencies to take advantage of these opportunities to embrace the flexibility and adaptability required to address the challenges and move the market forward.

As experts in both autonomous systems engineering and strategic business planning, IGM sees the incredible opportunity present to fully enable large scale deployment of autonomous systems with our FAST Engineering approach.

Enabling engagement in partnerships and joint ventures with the incumbents, adjacent industry leaders, and even start up vehicle framework providers, sensor providers, and data collection and management experts, FAST engineering not only paves the way forward to large scale deployment of autonomous vehicles, but also serve as a means to approach all complex systems engineering from a new perspective.