

**The next Issue of Newsletter will be published in week of 11 August 2014. Article ideas are welcome!**

## HOLD THE DATES!!

### IEEE Schenectady Section Engineering Colloquium

Friday, September 19, 2014

College Park Hall at Union College, 450 Nott Street, Schenectady, NY 12308

This one day conference will have 7 presentations with continuing education (PDH) credits.

Speakers and topics will include:

Speaker	Company	Topic
Steve Dean	National Grid	Interconnection Process and Requirements - Load Customers
Chris Vance	National Grid	Interconnection Process and Requirements - DG Customers
Jamie Barrett	NYISO	Interconnection Process and Requirements
Reigh Walling	Walling Energy Systems Consulting	DG system grounding and over-voltages
John Golde	Golde Engineering	Substation Ground Grid Analysis and Design
Tom Short	EPRI	Open-Source Tools for Power System Modeling
Engineering Executive	Price Chopper	TBD

More information regarding registration, fee, parking, etc. will be available in a couple weeks.

Contact: [Vincent.J.Forte@ieee.org](mailto:Vincent.J.Forte@ieee.org)

### Global Foundries, Fab8, Malta facility Tour

Tour will begin at 4:30 pm on August 20, 2014.

Portions of the facility are off limits such as the Fab area itself and the Gas and Chemical areas. However, the tour will include areas such as the Sub-Fab, CUB, ESB, and Mechanical/Electrical spaces.

**The tour will be limited to 15 people.**

(Parking will be tight, if anyone can car pool together that would be a good idea.)

You must provide your own Personal Protective Equipment (PPE) listed below.

1. Safety glasses. They must be clear and no dark color.
2. Hard hat
3. Reflective safety vest in bright color
4. Safety steel toe shoes
5. Safety gloves for abrasive protection

No cameras or touching equipment will be allowed.

Email [Vincent.J.Forte@ieee.org](mailto:Vincent.J.Forte@ieee.org) to reserve your seat and to provide your email address for additional details as they become available.

# Multi-Dimensional Thinking for Patents

## John Hershey

Editor's Note: John Hershey will be writing articles related to "Patents" throughout 2014.

His articles published in Section Newsletters are:  
Patents and Patent Searching – February 2014  
Improvement Patents – April 2014

### Encountering Dimensionality

As a prelude to studying combination inventions, we need to first escape our low dimensional skin and embrace the dimensionality of conception. This is one of the most difficult things to practice as it is a counter-teaching to the steady drumbeat we have been hearing in so many ways for so very long and that is simply that we must "dedimensionalize" or reduce our scope to only a few essentials. Otherwise, we are told, we shall suffer from a buzzword disease such as the contemporary one of "analysis paralysis." (At least it rhymes!)

When we were kids, we were taught to respect dimensions. "You can't mix apples and oranges." The words have rattled down the decades from our ancient authorities. But what does the message mean? Sure apples and oranges are different, but why can't you *mix* them?

The answer is in the word *mix*. In the apple-orange context, it is perhaps best interpreted as *interchange*. An apple is quite different from an orange. They are both great fruits but we celebrate their diversity with the admonition against interchange. Kids know this. We adults know this but somewhere along the line we have forgotten how to practice it. And our straying from the path has been quite subtle.

The apple and the orange differ in many dimensions. They taste different. They look different. They feel different. They do however have the same shape. They are both round. Well, a difference in three of the four dimensions is still quite adequate for us to distinguish among them.

But suppose we insist on looking at them in only one dimension, say shape. Then things begin to get a bit murky. And, incidentally, did you know that many folks cannot distinguish an apple from an onion if you block their sense of smell and sight and only let them taste and experience the texture when chewed? Many onions and apples are both sweet and texturally similar.

### Increasing Dimensions

Two dimensions are inherently much more difficult than one. Eddington the great physicist once remarked "We thought we understood two because we understood one and 'one and one are two.' What we are finding is that we must learn a lot more about 'and'."

What dimensions could be added for novelty and utility? The question often has a non-obvious answer.

### Can adding a dimension really help?

How about language? Search your own and others' thinking and speech patterns and see if you can spot unhelpful, ambiguity-insinuating dedimensionalization. Start with simple concepts and statements. For example, how do you speak about the weather? "It sure rains a lot in Seattle." Does it? The mean precipitation for a year is 38.44" But the mean yearly precipitation in New York City is 44.22" Is Seattle getting a bum rap? How has Seattle gotten this reputation? The *statistics* don't seem to bear it out.

But what statistics? What do we think we are comparing? What is it we really want to compare? Can a comparison *in one dimension* be meaningfully made?

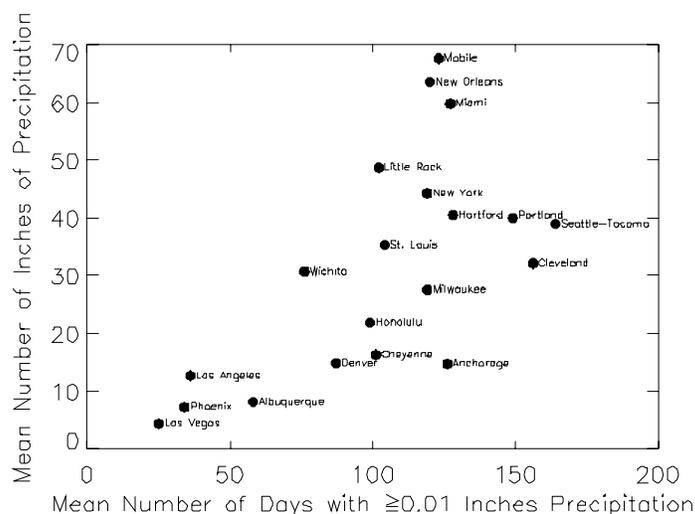
The graph following is a *two-dimensional* plot concerning some of the major cities in the US. Along the vertical axis we have the mean number of *inches* of yearly precipitation. Along the horizontal axis we have the mean number of *days* on which there is at least one one-hundredth of an inch of precipitation.

Note the mischief that can be had with more than one dimension. For example, if we compare Hartford, Little Rock, New York, Portland and Seattle-Tacoma on the basis of the mean number of days on which there is at least one one-hundredth of an inch of precipitation we find that the order is

*Seattle-Tacoma > Portland > Hartford > New York > Little Rock*

But if we order in terms of mean yearly inches of precipitation, the order is exactly reversed!

*Little Rock > New York > Hartford > Portland > Seattle-Tacoma*



**Too Many Dimensions May, However, be Harmful**

Sometimes too many dimensions are used. Sometimes the data is “sliced and diced” to the point of misleading the reader. As an example,\* consider that you are a senior military procurement officer and you need to buy a complex electronic gizmo. There are two manufacturers of such: NEID and HAMMEL. Which performs the best?

As fate would have it, two reports cross your desk. One is from the TESTALOT Corporation and the other is from the SHAKENBAKER Institute. Both of these fine and respected organizations have procured independent sample lots of the gizmo and done competent testing. Their results are shown in the following table.

	NEID GIZMO (Percent that worked)	HAMMEL GIZMO (Percent that worked)
TESTALOT RESULTS	45.5	42.9
SHAKENBAKER RESULTS	66.7	64.3

From the results shown in the table it appears that the NEID device is *clearly* superior as it “won” in *both* of the independent trial series.

But what was *not* reported, in an honest effort to save time and space, were the actual testing numbers. How many managers want to see those anyway? How many have the time for that?

The next table presents these hidden numbers. What do they tell us?

		NEID GIZMO	HAMMEL GIZMO
TESTALOT RESULTS	Number worked	5	3
	Number tested	11	7
SHAKENBAKER RESULTS	Number worked	6	9
	Number tested	9	14

The data tell us that it is actually the HAMMEL device that is superior. In other words, were we in possession of the actual data, and were we so inclined, we could have formed our own statistic by lumping the independent raw data together as is done in the next table. Thus a conclusion that seemed so inescapable has been turned on its head. (The world is full of these “Executive Summaries”-they’re not always carefully labeled as such but they’re there nonetheless.)

\* Adapted from “Mathematical Games,” M. Gardner, *Scientific American*, March 1976, pp. 119+

	NEID GIZMO	HAMMEL gizmo
Probability of working	$(5+6)/(11+9) = 55\%$	$(3+9)/(7+14) = 57.1\%$

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John Hershey has a PhD in electrical engineering. He holds 193 US patents. He was elected a Fellow of the IEEE “for contributions to secure communications.” He has authored or coauthored 8 technical books. Some of the material for these articles is derived from his book **The Eureka Method: How to Think Like an Inventor** published by McGraw-Hill. He is not a patent attorney or a patent agent. He does not presume to give legal advice.

Editor's Note: If any IEEE Schenectady Section Member donates funds to this project, if you wish, please let either Section Chair or Newsletter Editor know, so that we can publish total amount raised by Section to this cause.

## **Cobleskill MicroHydro Project** **Jonathan Di Cesare** **Eagle Scout candidate for Troop 56, Lawyersville, NY**



Do you believe in youth as the future of America?

Do you believe in entrepreneurship?

Do you believe in sustainability?

If so, please read on...

My name is Jonathan DiCesare, I am a senior at Cobleskill-Richmondville High School and an Eagle Scout Candidate for Troop 56 in Lawyersville, N.Y. I am building a micro hydroelectric facility on an existing dam in Veterans Memorial Centre Park, Cobleskill N.Y. Part of this work will satisfy my Eagle Scout Service Project requirement.

This ambitious undertaking consists of a 12 ft. metal water wheel and a drop turbine, plus a mill style equipment house and commemorative and educational signage. The facility will generate roughly 6 kW of renewable energy each day of operation for the Village of Cobleskill, while enhancing the aesthetics of the park and providing a teaching opportunity for local educational institutions. It will be unique in New York State.

I have actively worked for two years completing feasibility studies, leading a team of engineers to create designs, and

coordinating with local officials to receive approvals. This has been a tremendous opportunity to gain real world experience and leadership skills while benefiting my community.

Construction is poised to begin this summer. We have leveraged in-kind donations from the community for much of the labor and materials, and have already raised over \$15,000 of the \$32,000 in hard costs for the project. We are working with the Village of Cobleskill, Cobleskill Partnership, Inc. (a local 501c3), Lamont Engineering, Assemblyman Pete Lopez, and other volunteers to bring the project to life.

Please support this worthy community project with a tax deductible donation. To make donation please send a check to CPI (Cobleskill Partnership Inc.). Further information is on the second page.

I hope we can count you in!

Sincerely,  
Jonathan DiCesare  
Eagle Scout Candidate and Project Manager

**Donation Information**  
**CPI (Cobleskill Partnership Inc.)**  
**PO Box 10**  
**Cobleskill, NY 12043**  
**Memo Line: Hydroelectricity**

For more information and to follow my progress, please visit and "like" Facebook page: "facebook.com/cobleskilldam". If your organization is interested in a personal presentation or to discuss the project, please contact me directly to set up a meeting at [smlepwr@gmail.com](mailto:smlepwr@gmail.com) or by phone at (518)-657-9012 or (518)-231-2290

[Click here](#) for Cobleskill Hydroelectric Project Facebook page.

## IEEE Resume Lab

IEEE ResumeLab – has been launched for member use!

ResumeLab allows IEEE members to use customized templates to create resumes/CVs, letters related to the employment process, portfolios of past work, skills profiles, and video resumes. The product also provides members with the ability to conduct mock interviews. Finally, everything created in the product can be shared with colleagues, mentors, potential employers, the public, or social media via publicly-available links. Visit [www.ieee.org/resumelab](http://www.ieee.org/resumelab) to see information about the product.

## 2014 Section Officers

<b>Executive Committee</b>		<b>Electron Device Society</b>	
Chair	Chandra Reis, creis@ieee.org	Chair	Stanley Kocsis, kocsis@ieee.org
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Vice Chair, Treasurer	James Barrett, jbarrett@nyiso.com	Vice Chair	Yun Zou, zou@research.ge.com
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<b>Computational Intelligence Society</b>		Vice Chair	Yun Zou, zou@research.ge.com
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<b>Computer Society</b>		Chair	Abouzar Ghavami, abouzar_ghavami@yahoo.com
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Vice Chair	Qin Chen, chenq@ge.com		Bo Gong, gongbo76@yahoo.com
<b>Education</b>		<b>Signal Processing Society</b>	
Chair	Vacant	Chair	Michael Lexa, lexa@ge.com
Vice Chair	Vacant		

## 2014 Appointed Officers

Newsletter Editor	Krishnat Patil, k.patil@ieee.org	<p>Is your local society staffed? If not, we need you. A Society with no Events/Talks/Meetings for 3 years will be dissolved by IEEE.</p>
Webmaster	Rebecca Nold, r.nold@ieee.org	
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Nominating Committee Chair	Saber Azizi	
Section Historian	Neal Taylor	
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## IEEE-USA Legislative Update:

The IEEE-USA web site offers timely summaries of legislation that concerns you! Check IEEE-USA's Legislative Action Center ([www.ieeeusa.org/policy](http://www.ieeeusa.org/policy); look in the upper right).