



Reliability

# News

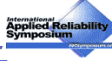
## TOP EVENTS:



Rel Symposium



Webinar



ARS



print version

Winter-Spring 2008

## IN THIS ISSUE

**COURSES and SEMINARS - CQE Certification. 2008 Symposium Schedule**

**EVENTS - Ops A La Carte Reliability Symposium, Ops-SigmaQuest-Symphony Webinar, Ops-BQR-Hanse Seminar, Applied Reliability Symposium (ARS)**

**SPECIAL OFFERS - Free Admission to any upcoming Ops a La Carte event**

**NEWS - We are now offering services in the Semiconductor Reliability area, Successful series of shows - RAMS, DesignCon, CMSE**

**FEATURED SERVICE - Semiconductor Reliability**

**PROBLEM SOLVER - Production Line Yield**

**ADVERTISEMENTS - SigmaQuest, LinkSV, and DfR Solutions**

**JOB OPENINGS - Many companies are now hiring. See the job openings below for more details.**

Theme this newsletter:

## SEMICONDUCTOR RELIABILITY

### COURSES

▶ **Certified Quality Engineer (CQE) Preparation Course** (pdf) - **April 1-May 20, 2008**

To register, email us at [CQECourse@opsalacarte.com](mailto:CQECourse@opsalacarte.com)

▶ For details see the [Ops A La Carte Schedule](#)

### SEMINARS

**2008 Reliability Symposium** ([click here for the brochure for more details](#))

▶ We will be holding our 2008 Reliability Symposium the week of April 7-11 and we are putting on the following seminars:

- ▶ [Design for Reliability \(DfR\), Apr 7-8](#)
- ▶ [Best Accelerated Reliability Test Methods: HALT, ALT, and RDT, Apr 9-10](#)
- ▶ [Design for Climatic Conditions, Apr 7-8](#)
- ▶ [Design for Testability \(DfT\), Apr 9](#)
- ▶ [Design of Experiments \(DoE\), Apr 7-8](#)
- ▶ [Design for Warranty Cost Reduction \(DfW\), Apr 10](#)
- ▶ [Mechanical Design for Reliability \(MDfR\), Apr 9](#)
- ▶ [Root Cause Analysis \(RCA\), Apr 10-11](#)
- ▶ [Software Reliability, Apr 11](#)
- ▶ [Statistical Process Control \(SPC\), Apr 11](#)

▶ Ops A La Carte holds our symposium once a year, featuring the top seminars asked for most frequently by customers throughout the year. Inquire if interested at [seminars@opsalacarte.com](mailto:seminars@opsalacarte.com)



[Ops A La Carte 2008 Symposium Brochure \(pdf\)](#)

▶ All our seminars, including those being offered during the symposium as well as those that are not, are offered as **in-house tailored** seminars. To view a list of all our seminars, go to [Ops A La Carte Course List](#)

▶ For details see the [Ops A La Carte Schedule](#). We recently announced our schedule for 2008.

## EVENTS

### ▶ Ops A La Carte Part of PATCA Panel - March 13, 2008, 6-9pm Pacific Time (PST)

Ops A La Carte joins a panel of three to discuss "Three Views on Consultant Marketing." Ops A La Carte is representing the vantage point of the entrepreneur - "It just takes hard work. Get your name out there again and again by networking, advertising, partnering, and constantly promoting your company." Please email us at [events@opsalacarte.com](mailto:events@opsalacarte.com) if you would like more information on this discussion.



### ▶ Ops A La Carte Joint Webinar w/SigmaQuest & Symphony Consulting - March 14, 2008, 9-10am PST

Ops A La Carte and SigmaQuest are teaming up for their 2nd combined webinar. This one is entitled "Managing Outsourcing Quality Risks". The webinar is FREE. Please email us at [events@opsalacarte.com](mailto:events@opsalacarte.com) if you would like the link to this webinar.



### ▶ Annual Reliability Symposium in San Jose, CA - April 7-11, 2008.

Ops A La Carte holds our symposium once a year, featuring the top seminars asked for most frequently by customers throughout the year. See the "Seminar" section above for more details. We have as a special guest for our "Best Accelerated Reliability Tests" seminar on April 9-10 - Dr. Michael Pecht from the University of Maryland's Center for Advanced Life Cycle Engineering (CALCE). Dr. Pecht will be giving an overview on his work in Electronic Prognostics. This will compliment the rest of the seminar on accelerated testing of electronics and mechanical products with a section on Mechanical Prognostics. Email us at [events@opsalacarte.com](mailto:events@opsalacarte.com) for more information on this event.



↓ [Ops A La Carte 2008 Symposium Brochure \(pdf\)](#)

### ▶ Del Mar Electronics (DMES) - April 30-May 1, 2008.

Ops A La Carte will be co-exhibiting in booth 351 along with Reliability Resources, Quality Testing Services, SoCal Testing, and DfR Solutions. It will be held at the Del Mar Fairgrounds in San Diego. Email us at [events@opsalacarte.com](mailto:events@opsalacarte.com) for more information on this event.

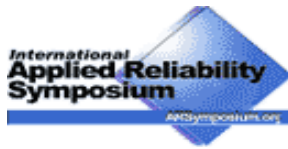


### ▶ Seminar at BQR's Practical Reliability and Maintenance Symposium in Israel - May 4-8, 2008.

Ops A La Carte has teamed up with BQR, Hanse Environmental, and A.O. Ezra Electronics to hold a 5 day Reliability Symposium in Israel. The first three days will be focused on Accelerated Reliability Techniques of HALT/HASS/ALT. The next two days will be focused on FMEA. More details coming soon on this symposium. Email us at [events@opsalacarte.com](mailto:events@opsalacarte.com) for more information on this event.

▶ **Applied Reliability Symposium (ARS) in Reno, Nevada - June 17-20, 2008.**

We shall be presenting a joint presentation called "Practical Software Failure Analysis". We shall also be exhibiting at this symposium so please come by our booth. For more details, please go to <http://www.arsymposium.org>. Email us at [events@opsalacarte.com](mailto:events@opsalacarte.com) for more information on this event. Also see our give-away for a free ticket to the ARS in the [Problem Solver](#) section of this newsletter.



Email us at [events@opsalacarte.com](mailto:events@opsalacarte.com) for more information on any of these events above.

#### SPECIAL OFFERS

▶ **\$1000 off** your next service or a free pass to any of our upcoming events or seminars *to the first individual that introduces us to a new consultant that we bring on to our team*. We are growing rapidly and are looking for the best technical operations' consultants out there. If you know of anyone, please pass their name to us at [events@opsalacarte.com](mailto:events@opsalacarte.com).

#### NEWS



- February 28, 2008

**Ops brings on 2 new consultants in the Bay Area.** Please welcome Murray Shubaly and Cliff Lange. Murray and Cliff both have extensive experience with large systems and in creating and managing reliability programs. We are excited to have both consultants join our team. You can read more about each consultant in the [AboutUs/OurTeam](#) section of our website.

- February 25, 2008

**HALT/HASS Lab Getting Leading Indicator Work.** After filing for our patent last fall, we have landed several large Accelerated Life Test projects, and we are using our new Leading Indicators methods. This methodology is helping us accelerate the testing even more by testing to an indication of change in performance rather than to failure, and with this, we can extrapolate to determine the end of life much before a failure occurs. You can read more about this process in the presentation we gave at the IEEE Accelerated Stress Test and Reliability Workshop. [Download](#)

- February 20, 2008

**Ops brings on 2 new consultants in Southern California.** With the increasing demand for reliability consulting in Southern California, we have added a consultant in the region. Please welcome Alex Fashandi, previously of Delta Design. Alex will be working out of San Diego. Also, Gil Bastien has returned to consulting and is back on our team. Gil works out of Los Angeles. Both Alex and Gil will be servicing all of our clients in Southern California. You can read more about each consultant in the [AboutUs/OurTeam](#) section of our website. For any requests in the Southern California area, please contact Clayton Bonn, our regional sales manager for Southern California. Clayton can be reached at [claytonb@opsalacarte.com](mailto:claytonb@opsalacarte.com) or 714-903-1005.

- February 15, 2008

**Ops A La Carte opens a new consulting center in New Delhi.** "We are proud to announce the opening of our newest consulting center in New Delhi, India" says Managing Partner Mike Silverman. "This is now our third consulting center, the other two being California and Singapore. Our New Delhi facility is structured to service the entire Indian market, including Bangalore, Chennai, Mumbai, Bombay, Delhi, and all of the other high tech areas. And we shall be offering all of the same great services and seminars out of this consulting center that we have been offering at the other two." See the [About Us/New Delhi](#) section of our website for more details. Please contact us if you are located in India or have a subsidiary in India that may need any reliability consulting services or reliability training.

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- February 8, 2008

**Ops A La Carte creates partnership with three UK consultants to form Ops UK.** Bob Page, Martin Shaw, and Niall MacLoughlin all lead successful consulting practices in the UK, so we have chosen to team up with them to expand our offerings into Europe. See the [About Us/UK](#) section of our website for more details. Please contact us if you are located in Europe or have a subsidiary in Europe that may need any reliability consulting services or reliability training.

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- February 1, 2008

**Ops A La Carte announces new Semiconductor Reliability services.** Leading these services are our new consultants George Denes and JW Smith. Both have a wide range of semiconductor design and reliability experience. See our new services page [ICReliability](#) for more details on the services these two will be performing.

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- January 31, 2008

**Ops A La Carte successfully completes three back to back shows - RAMS, DesignCon, and CMSE.** See last quarter's newsletter for details on each of these events. Below is a picture of the Ops A La Carte team in front of our booth giving away our grand prize Las Vegas gift basket to the lucky winner (pictured in center). All papers and presentations are now loaded on our website at [TechPapers](#).



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- January 15, 2008

**Ops A La Carte Singapore continues to grow.** Our Singapore and Taiwan operation continues to grow stronger with a lot of new business development in that region.

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- January 7, 2008

**Ops A La Carte in talks with rep firm in China.** "We are looking to expand our operations in Asia by opening an office in China. We are in talks with a rep firm in China and hope to have an office up and running by Q208" says Managing Partner Mike Silverman.

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► **For more information** on news, please visit our [News Page](#) or call (408) 472-3889.



## Semiconductor Reliability:

### Semiconductor Reliability Product Life Cycle Services

As with every other type of product, semiconductors require a carefully laid out reliability plan that addresses each phase of the product life cycle. When we do this, we can then integrate this process into the development process to have a very cohesive reliability program. Below, we have described the reliability life cycle process for semiconductor products. You can read more about this on our website at [ICReliability](#).

#### DEVELOPMENT PHASE

**BIR (Built In Reliability)** during wafer fabrication process development.

- 1) Each vertical process module (i.e. oxide growth, plasma etch, etc.) should have reliability metrics, measured on test structures (i.e. gate oxide capacitors, poly resistors, metal traces, etc.). This is not an issue using a wafer foundry with an established qualified process, but getting the "due diligence" information from the foundry and auditing the process is an important reliability engineering task.
- 2) Evaluation of the wafer process qualification results, process control results, ongoing quality/reliability monitor data.
- 3) Deprocessing/cross sectioning of a sample product or wafers to analyze potential reliability issues.

#### DFR (Design For Reliability)

- 1) Participate in the technology vs. design development process, working with Design Engineering to ensure a reliable final product.
- 2) Develop Special Reliability Test Chips if needed to test/stress critical circuit features and/or design concepts for reliability including ESD (Electrostatic Discharge) and latchup immunity.

**DFT (Design For Testability)** for both volume production pass/fail testing and during HTOL (High Temp. Operating Life test) to ensure very high fault coverage and toggle rate coverage of gates (for over 90 % gate toggle coverage during dynamic burn-in).

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#### PRODUCT QUALIFICATION/VOLUME PRODUCTION RAMPING PHASE:

- 1) Develop Reliability Qualification Plan.
- 2) Develop Highly Accelerated Lifetime Testing procedure to find weaknesses.
- 3) Design all required hardware for Product Reliability Qualification, i.e. dynamic lite test burn in board, Highly Accelerated Temperature/Humidity Stress Testing (HAST) board, etc.
- 4) Direct the Reliability Qualification process.
- 5) Conduct Failure Analysis of qualification test rejects, directing development of corrective action plans, close on corrective actions.
- 6) Develop SLBC (Statistical Bin Limit Control) procedures to remove the "outliers" from the normal distribution of product. This is a very powerful tool to enhance product reliability and reduce field failure rate.

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#### PRODUCT MATURITY PHASE:

- 1) Review/direct/manage Ongoing Reliability Monitors from wafer fabrication and based on finished product reliability testing.

- 2) Direct Failure Analysis/corrective actions based on reliability monitor failures and customer returns.
- 3) Propose design changes to address field-and monitor failures.
- 4) Evaluate proposed fabrication process changes.

*Mention this article and receive 10% off your next Semiconductor Reliability Test service.*

## PROBLEM SOLVER

### PRODUCTION LINE YIELD

A plastics plant operates 8 extruders producing plastic film. Production volume requirements cannot be met if less than 6 extruders are operating. There is a 0.30 probability that a machine stopping malfunction will occur. What is the probability that 6 extruders can remain operating throughout the day?

#### **Send Responses to:**

You can email us at [events@opsalacarte.com](mailto:events@opsalacarte.com). The first individual that emails us a correct solution shall receive **\$1000 off** your next service or a free pass to any of our upcoming events or seminars.

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Solution to Last Quarter's Problem of the Month on **Prognostics**:

#### **PROBLEM: LOTTERY PROBABILITY**

The Lottery draws six numbers from 1 to 50. No number is repeated. How many unique combinations are possible?

**SOLUTION:** We shall use the formula for calculating combinations of events as follows:

$$C_r^n = n! / r!(n-r)!$$

This notation is referred to as "n choose r", and is equal to the number of combinations of size r made from n possibilities.

Using the combination formula, we get the following:

$$C_6^{50} = 50! / 6! 44! = 15,890,700$$

**COMMENTARY:** Note that order does not matter in this type of scenario. If order had mattered, we would use a permutation formula. An easy way to remember the difference is to remember a combination lock was actually misnamed because the order of the numbers does matter.

**CONGRATULATIONS:** Congratulations to the winners that answered correctly. We had a tie for first because both answers came in within a few minutes of each other:

-- Michel Demers of Hydro-Québec Production and

-- Govind Ramu of JDSU

They are both still deciding which prize they would like (a free ticket to any upcoming event or \$1000 off any future service).

Also, congratulations to Paul Paroff of Advanced Input for getting the previous challenge on Redundant Reliability. Paul won a free trip to the Reliability, Availability, and Maintainability Symposium (RAMS) in Las Vegas this past January.



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LinkSV helps you tap into previously scarce and extraordinarily hard-to-find information on early stage companies and the key people associated with them. This will improve your effectiveness without the hassle and time of trying to do it all on your own. LinkSV is ideally suited to help you quickly identify and leverage your own connections in career search, in identifying new business opportunities, new investors and Board members.



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**Senior Reliability Engineer**

Intuitive Surgical is the global leader in the rapidly emerging field of robotic-assisted minimally invasive surgery. We make the daVinci™ Surgical System and its accessories, which together form a complex electro-mechanical servo device with advanced materials, tight tolerances, and high customer expectations. We seek a strong technical contributor who can help define practical, useful reliability metrics and specifications, identify key opportunities for product improvement, initiate reliability test programs, and lead implementation of the program into the product development process. An ideal candidate possesses a broad base of experience in reliability of integrated systems including electrical, mechanical, and software reliability, and is equally at home in the test lab and providing technical leadership to our team as we develop standard practices of our organization. The position involves failure analysis, solving hard problems, project leadership, and teaching/influencing the engineering staff in general reliability principles, reliability analysis, protocol development, and design for reliability methods.

To apply, please submit your resume after following this link to Career Opportunities -> Engineering -> Sr. Reliability Engineer  
<http://www.intuitivesurgical.com/corporate/careers/index.aspx>



**Senior Reliability Engineer**

Bloom Energy, a fuel cell company and one of Silicon Valley's most promising startups, is looking for a Senior System Reliability Engineer to join its world class team. This individual should be an engineer who is looking for a rewarding future in one of today's most exciting technologies.

Job Title/Description: Serve as the primary Sr. System Reliability Engineer for a new state-of-the-art alternative energy-producing fuel cell system.

For more info, please email [jbraggin@bloomenergy.com](mailto:jbraggin@bloomenergy.com)



**Sr. Reliability Engineer**

Advanced Energy develops innovative power and control technologies that drive high-growth, plasma thin-film manufacturing processes worldwide, including semiconductors, flat panel displays, data storage products, solar cells, architectural glass, and other advanced product applications.

We are seeking a senior member of technical staff in our Reliability Engineering group. This position requires performing engineering work in applied research, design, development, testing, manufacturing, and

documentation of products or systems. You will work with customers to understand equipment/system requirements and to ensure that the product(s) work in the application(s). You must use research techniques to analyze and validate design or theory concepts. You will provide direction and leadership to engineers and engineering technicians related to program specific work. You will also interact with senior level professionals both internal and external to AE.

Please apply at: [Advanced Energy](#) or email [harry.mclean@aei.com](mailto:harry.mclean@aei.com)



### Super Tech for Compliance Group

Stratalight is a leader in the 40Gb/s market. They are looking for a super tech with 5 years supporting regulatory or reliability testing, 3 years testing optical components and systems, familiarity with PC-controlled test environment and ability to execute software commands.



### Senior Reliability Consultant

Ops A La Carte is looking for Senior Reliability Consultants *around the world* to join our team of consultants and work on some of the most exciting and challenging projects in the industry. Whether you have an existing consulting practice or are interested in developing one, please contact us.

If interested, please email [hr@opsalacarte.com](mailto:hr@opsalacarte.com) or call (408) 472-3889.

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