



# Rocky Mountain AIChE News

February 2014

Volume 23 Number 5

## February Section Meeting: Lab Curiosity to Commercial Process – What It Takes

The road from the chemical engineering lab to a commercial process is a difficult one. It requires not only great technology and intellectual property (IP), but also, a market, a great team of generally multi-disciplinary staff who can work together effectively and are driven, money, and a lot of perseverance. For the case of a large company with deep pockets and an entrenched business it is almost impossible to start a radically new product line because of the immense market threshold required (that is, for a large company having \$25B/yr in revenue, the new product must typically have a potential market of maybe \$500M/yr, minimum). Product line extensions are much easier (less risky, less time to market – hence, less \$ required). For the case of a startup, those engaged need to be comfortable starting with almost nothing, bootstrapping, and willing to spend a lot of time searching for funds, partners and customers. For startups, those involved are usually paid below market rates and are engaged out of personal interest, the startup environment, and the potential for ultimate reward. Those involved in a startup need to understand that the risk takers (i.e. VCs) look almost entirely at the startup management as the most important consideration; IP is important from the aspect of protection, but is secondary and, hence, faculty members spinning startups out of their labs are generally lousy CEOs.

This talk will present first hand examples of both (1) the path taken from a laboratory curiosity to a successful commercial process at a major company (Dow Chemical) and (2) the paths taken by various

*(continued on page 2)*

## February Section Meeting

<b>Topic:</b>	Lab Curiosity to Commercial Process – What It Takes
<b>Speaker:</b>	Dr. Alan W. Weimer, H. T. Sears Memorial Professor of Chemical and Biological Engineering at CU Boulder
<b>Date:</b>	Tuesday, February 18 <sup>th</sup>
<b>Time:</b>	6:00 Networking / Dept Tours 6:30 Dinner 7:30 Presentation
<b>Menu:</b>	Harissa Chicken or Stuffed Portobello Mushroom (veg), couscous with diced vegetables, caramelized sweet potatoes, rolls
<b>Location:</b>	CU Boulder East Campus, Jennie Smoly Caruthers Biotechnology Building (JSCBB) auditorium A115 and lobby area 3415 Colorado Avenue, Boulder
<b>Cost:</b>	Members: \$20 (w/RSVP)* Non-Members: \$25 Students & Unemployed: \$10

**Please RSVP by FRIDAY, February 14<sup>th</sup>**, indicating your name, phone number, number of attendees. Please RSVP at [rockyaiche@yahoo.com](mailto:rockyaiche@yahoo.com) and pay at the meeting. You may also RSVP and pay online using the PayPal link on the website, <http://rockymtn.aische.org>.

\*Add \$5 for attending meeting without RSVP

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startups trying to commercialize lab IP out of the university (CU). “Skunk work” was a key activity for the large company success story and an example of how perseverance and personal career risk taking was key – it is difficult to be an entrepreneur within a large company. A key decision for the university spin-off is whether to accept VC funding, or, to bootstrap. That decision needs to be made based on two key aspects: (1) how much capital is needed (“Valley of Death”) to demonstrate the concept at a scale where it is believable and (2) is there a large existing or potential market to focus on that can be penetrated within 2 to 3 years (VC funding to continue to do research is typically non-existent). VCs will generally not fund without protection (i.e. IP) and the startup has only 2 to 3 years to success before the co-founders need a “bridge loan” and are effectively diluted in equity to the point where they lose interest and lose “their” company.

Universities are typically great places to invent “platform technologies” that can then be developed through licensing to large companies or establishing startups. Many students “don’t want to work for the man” because they have seen first-hand how their parents have been forced into early retirement by large companies. However, they also need to understand that “get rich quick” does not happen very often today, particularly the last 10 years of two major economic downturns and the intense competition of a global market. Insight, based on real experience, will be given to students and others who want to try the chemical engineering entrepreneurial route. The speaker does not in any way profess to be an expert in startups; and, it is hoped that discussion will follow with members of the audience providing their input as well.

Alan W. Weimer, H. T. Sears Memorial Professor of Chemical and Biological Engineering, joined the faculty of the University of Colorado in 1996 after a 16-year career with the Dow Chemical Company. He was named Dow Research Inventor of the Year in 1993, and received Dow’s “Excellence in Science Award” in 1995 for commercializing high-temperature processing to produce advanced materials. He was named University of Colorado Inventor of the Year in 2004 and received both the campus-wide and the College of Engineering and Applied Science Faculty Research Awards in 2005. He is recipient of the 2005 DOE Hydrogen Program

R&D Award for developing solar-thermal technology to split water, the 2009 AIChE Thomas Baron Award in Fluid-Particle Systems for his pioneering effort to functionalize fine particles with thin films, and the 2010 AIChE Excellence in Process Development Research Award for his persistence to commercialize his academic discoveries. His former students have co-founded two spin-off companies out of his university laboratory (ALD NanoSolutions in 2001 and Copernican Energy, now Sundrop Fuels, in 2006). He is an inventor on 29 issued U.S. patents and an author of 150 peer-reviewed publications. He received a 2004 R&D 100 Award for his invention and commercial development using atomic layer deposition to functionalize fine particles (i.e. Particle ALD). He recently received the 2011 State of Colorado Cleantech Industry Association Award for “Excellence in Bio-Derived Technology Commercialization”. He teaches the capstone design sequence in chemical engineering at CU, but, also has a research team of 15. He anticipates potentially two additional startups out of his university lab over the next 5 years based on projects currently supported by the Advanced Research Projects Agency – Energy (ARPA-E).



*Dr. Alan W. Weimer*

## **2014 Rocky Mountain Student Regional Conference**

The Rocky Mountain Student Regional Conference will be held on March 28-30 at the University of Utah, and will feature the annual Regional Chem-E-Car competition, Research Paper competition and Chem-E Jeopardy competition.

# BE A JUDGE AT THE STATE SCIENCE FAIR

State Science Fair time is fast approaching. Judging will occur on April 10, 2014. If you aspire to participate in the next "America's got Science Talent", this is the job for you. Contact Michael Mutnan at [mmutnan@juno.com](mailto:mmutnan@juno.com) for more information.

We are classified as "Special Judges" since we focus on Chemical Engineering related projects. Awards (monetary and certificates) are given to 1<sup>st</sup> and 2<sup>nd</sup> Place in the Senior and Junior High Divisions. We also invite the winners to be our guests at one of our meetings.

The science fair group must be informed who our judges are by March 1 for inclusion into a "Judges Database". Once on the list, you will receive a packet with particulars, and more importantly, a badge that gets you into the judging area.

Michael can access the database for late inclusions. Last year badges were issued to judges not on our list, so a last minute decision seems to be OK.

Due to renovations at the CSU Student Center, the competition will be held at the Hilton Hotel on Prospect Road in Fort Collins. The hotel is on the south side of the campus.

In the past parking was available at the CSU Equestrian Center for judges. This included bus service to campus. I have not heard from the Science Fair staff what arrangements will be this year. I have been to meetings at this Hilton and its' parking lot fill up very quickly.

Judging is held 12:15 p. m.to 5:00 p. m. A short meeting occurred in the past at around 11:00 a. m. with lunch (pizza and drinks). Again, no word on what will occur this year.

In spite of all of this, you can look forward to a very rewarding day. The competition has always been fierce.

COME AND PARTICIPATE, YOU WILL ENJOY IT.

## Humor For Mature Adults

1. I think part of a best friend's job should be to immediately clear your computer history if you die.
2. There is great need for a sarcasm font.
3. How the hell are you supposed to fold a fitted sheet?
4. Was learning cursive really necessary?
5. Obituaries would be a lot more interesting if they told you how the person died.
6. Bad decisions make good stories.
7. You never know when it will strike, but there comes a moment at work when you know that you just aren't going to do anything productive for the rest of the day.
8. Can we all just agree to ignore whatever comes after Blue Ray? I don't want to have to restart my collection...again.
9. I'm always slightly terrified when I exit out of Word and it asks me if I want to save any changes to my ten-page technical report that I swear I did not make any changes to.
10. I keep some people's phone numbers in my phone just so I know not to answer when they call.
11. I wish Google Maps had an "Avoid Ghetto" routing option.
12. I have a hard time deciphering the fine line between boredom and hunger.
13. How many times is it appropriate to say "What?" before you just nod and smile because you still didn't hear or understand a word they said?
14. Shirts get dirty. Underwear gets dirty. Pants? Pants never get dirty, and you can wear them forever.

## AIChE Meetings

### 2014

Mar 10-11	6th Annual Midwest Regional Conference University of Illinois at Chicago
Mar 16-19	4th Int'l Conference on Stem Cell Engineering Coronado Island Marriott Resort Coronado, CA
Mar 28-30	2014 Rocky Mountain Student Regional Conference University of Utah
Mar 30-Apr 3	2014 Spring Meeting and 10th Global Congress on Process Safety Hilton New Orleans – Riverside
June 15-19	Metabolic Engineering X Westin Bayshore Vancouver, B

### National AIChE Contact Info

**AIChExpress Service Center:**  
(US/Canada): 1-800-AIChemE  
(1-800-242-4363)  
(International): 203/702-7660  
Fax: 203/775-5177  
E-mail: [xpress@aiche.org](mailto:xpress@aiche.org)  
**Member Services:** 800.242.4363  
**Career Services:** 646.495.1330  
**Awards & Honors:** 646.495.1317  
**Address:** 3 Park Avenue  
New York, NY 10016-5991  
**Web Page:** <http://www.aiche.org>

## Rocky Mountain AIChE Officers

Martin Vorum	Chair	303/843-3019 <a href="mailto:martinxp9@yahoo.com">martinxp9@yahoo.com</a>
Brian Olson	Vice-Chair / Program	720/ 286-3488 <a href="mailto:brian.olson@ch2m.com">brian.olson@ch2m.com</a>
Crystal Smalley	Treasurer	303/ 353-3726 <a href="mailto:crystal.smalley@merrick.com">crystal.smalley@merrick.com</a>
Mike Mutnan	Secretary	<a href="mailto:mmutnan@juno.com">mmutnan@juno.com</a>
Cory Jensen	Membership	970/219-5990 <a href="mailto:cory.jensen.co@gmail.com">cory.jensen.co@gmail.com</a>
Tom Wellborn	Director	(303) 933-0533 <a href="mailto:twellborn@astraenergy.net">twellborn@astraenergy.net</a>
Kevin Milliman	Past Chair	303/704-7530 <a href="mailto:Kmilliman94@gmail.com">Kmilliman94@gmail.com</a>
Mike Moes	Communication	303/796-0535 <a href="mailto:mmoes@ekiconsult.com">mmoes@ekiconsult.com</a>
Patrick Burton	New Mexico Liaison	<a href="mailto:pdburto@sandia.gov">pdburto@sandia.gov</a>
Dr. Patrick Johnson	Wyoming/SD Liaison	<a href="mailto:pjohns27@uwoyo.edu">pjohns27@uwoyo.edu</a>
Cory Jensen	Student Chapter Liaison	970/219-5990 <a href="mailto:cory.jensen.co@gmail.com">cory.jensen.co@gmail.com</a>
Laura Moes	Editor and Web Admin	303/770-2432 <a href="mailto:lauramoes@msn.com">lauramoes@msn.com</a>

Rocky Mountain AIChE News is published eight times a year by the Rocky Mountain section of AIChE. Opinions expressed herein are those of the authors and are not necessarily those of AIChE nor the officers of this section.

The objectives of AIChE are to advance chemical engineering in theory and practice, to maintain a high professional standard among its members, and to serve society, particularly where chemical, engineering can contribute to the public interest.

## Rocky Mountain AIChE News Publication Schedule

### February 2014 issue

Articles due Wednesday, March 5<sup>th</sup>  
Publish on Friday, March 7<sup>th</sup>  
Meeting on Tuesday, March 18<sup>th</sup>

## MEETING SCHEDULE

*The Rocky Mountain District of AIChE generally meets the third Tuesday of every month, September through November and January through May.*



Rocky Mountain AIChE News  
America Institute of Chemical Engineers  
7900 S. Monaco Ct.  
Centennial, CO 80112-1326

On the Web at:

<http://rockymtn.aiche.org>

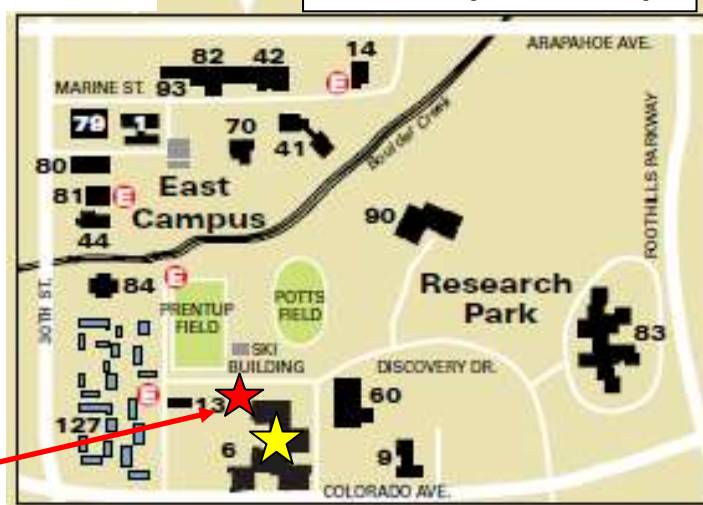
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CU Boulder Interactive map:

<http://www.colorado.edu/campusmap/index.cgi?bldg=BIOT>



East Campus Closeup



Parking Lot #543

**DIRECTIONS:** From I-25, take US-36 W toward Westminster/Boulder. Take the CO-157 N/Foothills Pkwy exit toward the CU Stadium for 0.6 miles. Merge onto Foothills Pky/CO-157 N via the ramp on the left toward CU Stadium/East Campus and drive 1.9 miles. Turn left onto Colorado Avenue. Turn right on Innovation Drive, then turn left on Discovery Drive and park in lot #543 on your left. This lot is free after 5 pm and is on the northwest corner of the Biotechnology (JSCBB) building, 3415 Colorado Avenue, Boulder 80303. ★