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JULY MEETING: ALTSEP – AN INDUSTRY-DRIVEN TECHNOLOGY ROADMAP FOR SEPARATION ALTERNATIVES TO DISTILLATIONS

David J.C. Constable, Ph. D.

Director of the American Chemical Society’s Green Chemistry Institute

[WEBEX MEETING NUMBER 635 888 409](#) (further directions on page 5)

THURSDAY, 28 JULY 2016

9:00 pm EDT, 8:00 pm CDT, 7:00 pm MDT, 6:00 pm PDT;

UTC/GMT 0100 29 July 2016



Abstract: This month, the VLS welcomes Dr. David Constable, who give us a behind-the-scenes tour to the transformational initiative described on the website www.altsep.org.

Rooted in a collaborative partnership between the American Chemical Society Green Chemistry Institute® (ACS GCI) and the American Institute of Chemical Engineers (AIChE), this

initiative aims to fundamentally change the way we apply separation technologies in chemical manufacturing.

Distillation is a well-understood, reliable predictable separation process that works. Recognizing that distillation at the heart of most chemical processes accounts for over 35% of the energy used in U.S. chemical manufacturing, ACS GCI and AIChE have joined forces to work with innovators across the separation process value chain to find ways to jump start the industrial application of less energy-intensive separation processes.

The first step in this journey is the creation of an innovation roadmap for advancing the rational design and predictable, widespread, industrial application of sustainable separation processes. The collaboratively developed roadmap will identify and prioritize research, development, and demonstration needs targeted at technology initiatives with the potential to transform the competitiveness and sustainability of the U.S. chemical enterprise.

The success of this initiative relies on the collective wisdom and effort of chemists and chemical engineers working together to pave the way for a next generation chemical manufacturing with sustainable separation processes at the core.



The Speaker: As Director of the American Chemical Society's Green Chemistry Institute[®], Dr. Constable works to catalyze and enable the implementation of green chemistry and engineering throughout the global chemistry enterprise.

From the end of September, 2011 until January, 2013 David worked as the owner and principal at Sustainability Foresights, LLC, a consultancy directed toward assisting companies with Sustainability, Sustainable and Green Chemistry, Energy, Environment, Health and Safety programs.

David left Lockheed Martin as the Corporate Vice President of Energy, Environment, Safety & Health (ESH) at the end of September 2011. Prior to joining Lockheed Martin, David was the Director of Operational Sustainability in the Corporate Environment, Health, and Safety Department at GlaxoSmithKline. In that global role, he championed Environment, Health and Safety support for New Product Development and Supply. He also led GlaxoSmithKline's development of programs, systems, tools, and methodologies that integrated sustainability, life cycle inventory assessment, green chemistry, and green technology activities into existing business processes. Prior to joining SmithKline Beecham, he served as a Group Leader in the SHEA Analytical Services group of ICI Americas.

VLS MEMBERS IN THE NEWS

Congratulations to **Noah Meeks**, Past Chairman of VLS. Noah and coauthor Steve Baxley authored an article entitled “Special Section: Energy - Fuel Cells and the Hydrogen Economy”, published in the July 2016 issue of *CEP*.

CONNECT THROUGH VLS: A PILOT PROGRAM

Noah Meeks



Establishing personal connections in a virtual local section presents a perennial challenge, but the VLS is committed

to making opportunities available to our members. To that end, we are going to try a short-term mentoring program. We think this will be attractive for busy professionals who want personal, professional connection outside their immediate workplace. The goal of this mentoring relationship is to establish a personal connection for VLS members within AIChE.

Unlike other mentoring programs, this one has three distinct features:

1. Defined length
2. Suggested activities
3. Prizes!!!

How does it work? Here’s all the fine print:

1. Express interest by answering the following in 1-2 paragraphs total, and send to VLS Past Chairman Noah Meeks (NoahChemE@gmail.com). This information will be used to pair participants. Please send by August 20th.

- a. Are you interested in being a mentor, mentee, or just connecting?
- b. Are you planning to be at the AIChE Annual Meeting in San Francisco?
- c. Where do you work and what is your role?
- d. What is your education/professional/personal background?

- e. What do you hope to give or gain in this program?

- f. What is your contact info that we should share with your mentor/mentee?

2. Participant pairs will be notified by email by August 31st.

3. Watch the AIChE webinar on mentoring:
<http://www.aiche.org/academy/webinars/mentoring-what-you-need-know-and-do>

4. Have a meeting, virtual meeting, or phone call at their convenience during September. We suggest discussing your career backgrounds/paths/outlooks/goals.

5. Have another meeting in October, again at their convenience. We suggest discussing AIChE participation, including technical divisions/forums/sections/meetings.

6. If feasible, meet in person in November at the AIChE annual meeting. There may be a VLS Social which

would be the perfect opportunity, so that we can also meet you both. For those not attending the Annual Meeting, we suggest discussing work/life balance and soft skills experience, and discussing whether this program has been effective.

7. Write a short (1 page max) overview of your meetings and your reaction to them. This can be done throughout the program or at the end.

8. Send the overview to NoahChemE@gmail.com. All participants who submit a synopsis will be entered into a random selection. The winner will receive their choice of a chemical engineering book or e-book, courtesy of the VLS. Their partner participant will also win a \$50 Barnes and Noble gift card. Both participants in a pair may submit an overview, which will increase the chances of winning!

9. Increase your chances of winning by attending VLS meetings August to November. For each meeting that a participant attends live, he or she will receive an additional entry, so that up to 5 entries may be accrued by each participant.

10. The most thoughtfully and meaningfully written overview (as subjectively selected by VLS leadership) will also receive a \$50 gift card and their overview will be featured in an upcoming VLS Newsletter.

11. Overviews are due by Dec 1st. The writing winner will be announced at the December VLS meeting, and the random winning participant will be selected and announced live at the December meeting!

12. Participation is limited to members of the VLS as of September 1, 2016. Contact membership services if you are unsure.

FROM THE CHAIR: VLS MENTORING!

Experience Nduagu



In my April column, I floated the idea of a VLS mentoring project. This month, I am very pleased to announce that Noah

Meeks has stepped up to the plate and is leading an innovative pilot VLS mentoring effort. Noah, a Past VLS Chairman and the founder of the Student Presentation Competition, gives details in his article, above, "Connect Through VLS".

I am passionate about mentoring because I have benefited from being mentored, as I described in my April column, and because I have also enjoyed and benefited from mentoring others. I also feel that, on general principles, mentoring benefits everyone, mentors, mentees, the profession, and society.

Let me be more specific. When my friend A.E. began mentoring me in math and physics, I began to see how I could reach my goals. I also no longer felt that I was in on a solitary journey, but rather that I was part of an elite and winning team. I chose A.E. as a mentor because I admired his accomplishments and wanted to excel as he

did. His generosity in helping me to do so was a great gift, without which I might never have become an engineer.

A.E. was just one of the many mentors I've had at different stages of my career, and all have been helpful, motivating, and inspiring. I feel indebted to all of them. As a result, I wanted to "give back", so I started to mentor others. For me, being a mentor was as inspiring as being mentored; I found mentoring satisfying and fulfilling, whether I was mentoring chemical engineering students or youths in Northern Nigeria community development programs. I enjoy meeting new people and building new, meaningful, and lasting relationships through mentoring, as well as gaining insights into other people's motivations, abilities, and aspirations. I also feel deeply rewarded knowing that I have helped others realize their dreams, as my mentors have helped me.

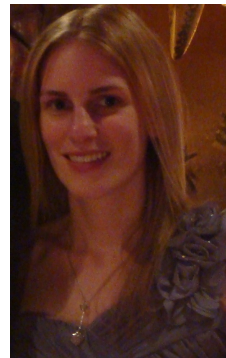
I hope that there will be wide participation by our VLS membership in Noah's innovative program. I foresee opportunities in this program for our members, at all career levels, to make personal and professional connections outside their immediate workplaces. I am excited by the potential this has to strengthen our sense of community within the VLS, the AIChE, and the profession. Even if you are not planning to be a mentor or be mentored right now, you can contribute and connect by sharing any mentoring experiences you have had with the rest of the membership. Simply send an email to me or to Noah, or to the editor of this

newsletter. Or share with the general AIChE membership through a discussion on Engage.

This pilot program will only last for three months, from September to December 2016. Please check out the announcement and respond as soon as possible. If you are interested.

FROM THE PAST CHAIR: UNWRAPPED

Amanda Scalza



Choosing to be a chemical engineer is not always a straight and narrow path. When we do choose it, it does not mean we turn our backs on all the other pathways we explored before we committed. In

my travels, (June Newsletter), I am still exploring some of my early interests. Let me share one with you and why it can be important for chemical engineering.

When I was five years old, I was sure I wanted to be a chef. I was so sure that I asked my parents to take me on a tour of a culinary arts college that year. As I grew older, I found a television show called "Unwrapped". The show was a behind-the-scenes look at the how food products are manufactured. I realized that while chefs can only feed those in their restaurants, food companies can feed everyone! So I knew exactly what I wanted to do when I grew up - I was going to make new flavors

of Oreos! My mother was very happy, because I had chosen a job where I could get health insurance.

“Unwrapped” is still inspiring me. A few weeks ago, I took a tour of the Tabasco factory in Avery Island, Louisiana. The entire experience enthralled me, particularly the simplicity of it. Tabasco is a hot sauce made with peppers, vinegar and salt. This recipe takes around three years from start to finish and has fans throughout the world. Not only did I enjoy the experience, but so did my husband, a healthcare worker. The most interesting part was the juxtaposition of old and new technology. The process starts with the tradition of fermenting the peppers in wooden barrels, and ends with the dizzying fast pace of the bottling line, each of which can fill over a hundred thousand bottles per day! It was a great way for him to understand some of the things I do at work every day in a common language: food.

When I was younger, we would often take trips to Wisconsin to visit family. Luckily, my family lived close to the Jelly Belly Factory. Jelly beans are also relatively simple in ingredients, with a process that involves multiple steps of mixing, drying and coating to create perfect texture. The beans are also extremely diverse, coming in hundreds of fun flavors. Then the part that comes back to my long love of cooking: at the Jelly Belly factory, they have a café, where, by putting multiple beans together, you can make fun new flavors! They even have Tabasco flavored jelly beans.

Whenever I find myself in new places, I indulge myself by seeking new food adventures. I am constantly rewarded with great memories, like learning about chocolate making and roller coaster physics at Hershey’s theme park in Pennsylvania or the way pop culture mixed with candy at the Pez factory in Orange, Connecticut.

As engineers, though, we should encourage this seemingly oddball pastime of food production tourism, because there is also real value in it. Food factories offer a fantastic mix of creativity, family fun, and dazzling displays of engineering ingenuity. They can inspire young people to pursue STEM education and help those in technical fields talk to their neighbors, friends, and family. This sort of outreach, in the hands of the factory guides, is great – we don’t even have to lift a finger – we can just enjoy the tour.

I am excited to see which food I will learn about next! Suggestions, anyone?

THE WORLD OUT THERE: ENGINEERING EDUCATION AND MORE INSTANT COFFEE

Neil Yeoman



Engineering
Education

There are two movements of which I am aware that might eventually impact on engineering

education. The first is with NCEES (National Council of Examiners of Engineering and Surveying) and is a movement to require an MS or equivalent (MOE) as the basic education to obtain a PE license. The movement originated with the leadership of ASCE (American Society of Civil Engineers) and may not be supported by the ASCE general membership, but it has taken hold with NCEES. The rationale is that BS degrees are not what they were when the PE system was first put in place. The claim seems to be that it used to be that 144 credits were required for a BS in engineering and now 128 credits is most common and some schools only require 120. Requiring an MS or equivalent to make up the difference is the proposed solution to this perceived problem. It seems like overkill but at least it has some logic. I am not up-to-date on the requirement for a BS in engineering in any discipline. My BChE (in 1956) required 153 credits, but that was because I was an ROTC cadet. Otherwise it would have required 144, but I can easily identify a dozen credits that were a waste of effort whose removal would have had no impact on my ability to function as a chemical engineer, although I do not know if those schools that require much less than 144 credits have streamlined their curricula in ways I would support. That said, AIChE opposes the MOE movement, and, I believe, rightly so. It should be noted, however, that many European schools have five year programs to produce chemical engineers and the US industry tends to think of that as an MS equivalent.

The other movement, which originates somewhere in academia, is more radical and more direct. The proposal is that professional engineering training follows the legal or medical model, that is, that the professional training start only after a bachelor's degree is obtained. The thinking there is that engineering is a profession that should have the prestige of law and medicine and that will only happen if the educational requirements are similar. Part of that thinking is that the BS "educates" and the following degree trains, that is, that the BChE I received only trained me but did not educate me, and the profession should be populated with "educated" people. More on this in a future column, maybe. Feel free to offer your comments to me at virtualtreasurer@aiiche.org.

I had originally planned to use this month's column to address the issue of the academia industry disconnect that then VLS chair-elect and Daniel Sujo raised in September 2015, but have chose to delay doing so to answer a question my May column raised

Decaffeination

A response to my May column asked about the decaffeination step of the Sanka Coffee manufacture. I thought I would respond when the rest of the coffee story was still fresh in people's minds and those who have

done as I asked still have their copies of the May newsletter.

The first step in the decaffeination process was similar to the extraction step in the instant coffee process. (Remember that what I am describing is how things were in 1957, so this may be as much history as technology.) The differences were that caffeine was removed from whole (green) beans before roasting and that the liquid used was not clean hot water but a "room temperature" caffeine free aqueous solution of everything else in green beans that is soluble in water called "green liquor."

As the green liquor goes through the decaffeination extraction step it is getting richer and richer in caffeine but the other dissolved solids content remains about the same. The caffeine rich green liquor flows to a liquid liquid column (which in our usual terminology would be called an extraction column but needs to be called something else here to avoid confusion) where it flows counter current against a stream of trichloroethylene which preferentially removes the caffeine from the green liquor. The caffeine depleted green liquor goes to a steam stripper to remove any trichlor not

removed by the decantation of the two liquid phases before again contacting the beans. The caffeine containing trichloroethylene goes to a second liquid liquid column where it flows counter current to a clean water stream that removes the caffeine. What follows is mostly unknown to me. It included caffeine recovery and purification steps based on crystallization. I did no work in the decaffeination area, nor did anybody else in the research department. I was only in the remotely located decaffeination plant on one occasion and then as a tourist, not a worker. Things there were kept secret and unnecessary people kept away. Some of my co-worker said that it was because being in the decaf plant was dangerous due to the presence of trichloroethylene. It wasn't too long after I left that the use of trichloroethylene was discontinued. In later years the decaffeination process used supercritical carbon dioxide but I do not know what the flow arrangement was.

[Ed. Note: Neil Yeoman is an active member of AIChE Engage, where he engages in lively discussions on a wide range of issues such as PE Licenses, Education, and Climate Change.]

ATTENDING A VLS MEETING

- **Join by internet:**
 - <https://aiche.webex.com/mw3000/mywebex/default.do?siteurl=aiche>
 - Search for VLS or by meeting number 635 888 409 (March) 634 167 017 (April)

- **Join by phone:** Access code: 634 167 017
 - 1-866-469-3239 Call-in toll-free number (US/Canada)
 - 1-650-429-3300 Call-in toll number (US/Canada)
 - [Global Call-in numbers](#)
 - [Toll-free calling restrictions](#)

Attendance at a Virtual Local Section Meeting is open to AIChE Virtual Local Section Members, AIChE members, and other interested people.

The statements and opinions in this newsletter reflect the views of the contributors, not of the AIChE or the VLS, neither of which assume responsibility for them.

PDH CREDIT FOR VLS MEETINGS

LAURA J. GIMPELSON, P. E.

Attendees of the Virtual Local Section Meetings can receive up to 1 hour of professional development credit that meets the continuing education requirements of most state professional engineering registrations. To receive the certificate documenting your attendance, send an email to the VLS secretary, Laura Gimpelson, at virtualaiche@gmail.com.

Include the following information in your email:

1. Name of the Presentation and Speaker
2. Attendee's name as listed on the registration certificate
2. Attendee's registration number and state/providence of issuance

The certificate, in pdf format, will be issued within 30 days of the receipt of the request.

JOB OPENINGS

Disclaimer: *Positions listed here have been contributed by VLS members and are listed in good faith as a courtesy to interested VLS members. The AIChE, the VLS, and VLS Newsletter staff are not responsible in any way for the content or veracity of the ads, or for the conduct of the employers or the recruiting agencies. Posting these ads is not an endorsement of the companies or the recruiters, nor is it a guarantee that these positions are still open or will be filled.*

Nicholas Meyler, nickm@wdsearch.com of [Wingate Dunross Inc.](#) is seeking a **polymer engineer**. He writes:

My repeat client is the *World's Leading Solar Power Company* and has retained me exclusively to search for and identify great candidates for a Polymer Scientist position. They offer competitive compensation/salary, excellent benefits, and relocation assistance. They have recently demonstrated industry-record efficiencies in their new solar panels, and are thus poised for significant growth.

Polymer Scientist/Engineer IV (Perrysburg, Ohio)

Primary Job Functions:

Innovates and develops photovoltaic (PV) modules using advanced materials, designs, and processes to optimize cost, durability and manufacturability.

Essential Functions & Responsibilities:

- Engages with 3 party institutions and vendors to identify polymeric materials suitable for PV module applications in terms of cost, performance, durability, and manufacturability
- Uses knowledge of structure/property relationships to model polymeric material thermo-mechanical performance and durability
- Uses knowledge of structure/property relationships to model environmental degradation of polymeric material performance and durability
- Uses knowledge of adhesive science to improve mechanical performance and durability of PV module with regard to environmental stressors

Required Education and Experience:

- 10 or more years experience working in a manufacturing setting preferred
- Graduate degree (Ph.D. preferred) in Physics, Materials Science/Engineering, Chemistry, Chemical/Polymer Science/Engineering or a related field

Required Experience:

- Demonstrated abilities to solve diverse problems through a combination of experimentation, characterization, and analysis
- Strong polymeric materials background

- Extensive skills in numerical data analysis utilizing advanced tools/software is expected
- Hands-on knowledge of visco-elastic materials behavior and characterization
- Statistical data analysis and design of experiments
- Demonstrated expertise in creating safe work environment
- Excellent communication skills, proven organizational skills
- Strong English written and verbal communications skills to ensure effective participation with interdepartmental teams

If you are interested in this outstanding opportunity, please send me a resume. Random resume submissions are always welcome, too. Referrals and recommendations are greatly appreciated.

Mr. Kelly Mitchell, Senior Corporate Recruiter, 502-396-6760, kelly@kellymitchell.net has several openings for civil, mechanical, and electrical engineers in several locations. Of particular interest to AIChE members, he is accepting resumes for:

CIVIL / ENVIRONMENTAL / CHEMICAL ENGINEER - Moline, IL and W. Des Moines, IA (2 positions)

QUALIFICATIONS

- Licensed Civil/Environmental/Chemical engineer
- 12 to 15 years of experience in design of utility systems and municipal and industrial water treatment and waste water treatment plants
- Ability to actively market water, waste water and utility collection/ distribution services

EXPERIENCE:

- Waste Water Treatment
- Collection/Distribution System
- Water Treatment Plant

General Cable, at <https://general-cable.jobs.net> is looking for several engineers, including

1. **Production Coordinator in Marshall, TX**
2. **Preventative Maintenance Engineer in Marshall, TX**
3. **Process Engineer in Jackson, TN**
4. **QA Manager in Marion, IN**
5. **Manufacturing Manage in Lawrenceburg, KY**

More information, applications, and additional jobs posted on the website, above.