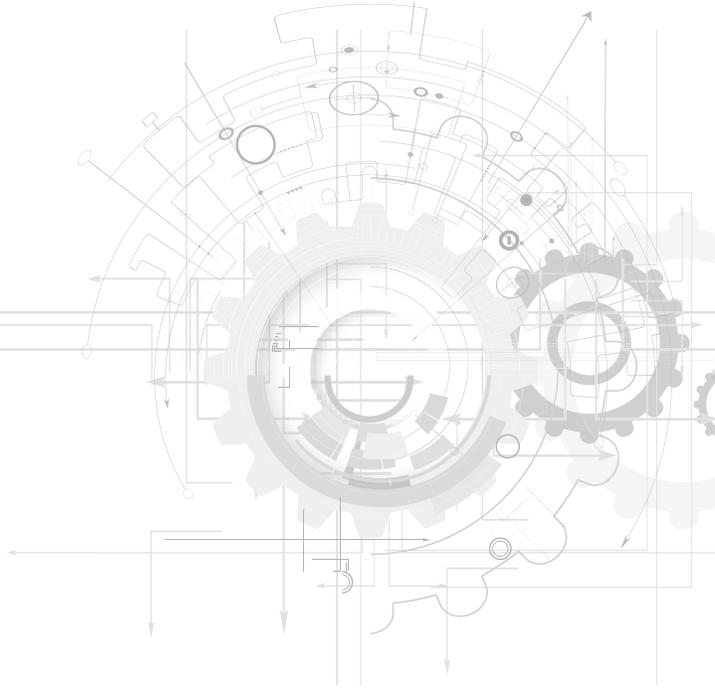


THE FUTURE IS ENGINEERING

*Summary of Omaha Engineering Summit
July 31st - August 1st, 2017*



Overview/Introduction



The issue of the future of the engineering profession is both deep and wide. For this reason, a small group of US engineers established an ad hoc group (the initial Steering Committee) to further explore this topic. The small group decided to host a summit, and invited many of their contacts (attached) to join them in an initial discussion about the future of the engineering profession – how can we develop a new vision and strategies to realize the profession’s full potential as stewards of technology on behalf of society? (For purposes of our efforts, a broad definition of technology was adopted: the application of scientific knowledge for practical purposes.)

In early 2016, the Planning Cabinet of the American Council of Engineering Companies (ACEC) was tasked with making long-term projections for the engineering industry and with assessing the potential impacts of technology on employee counts in private sector engineering firms. Several members of the Steering Committee were involved in those ACEC discussions. As part of those discussions, the ACEC Planning Cabinet was briefed on the work of the Canada Engineering Change Lab at the 2016 ACEC Fall Conference. In early 2017, members of the Steering Committee proposed that ACEC take the lead in sponsoring an initial gathering of stakeholders to participate in a deep dive into the future of the engineering profession. When ACEC leadership elected to prioritize other issues, the Steering Committee members elected to proceed independently with the summit. ACEC leaders were briefed on the plans for the summit.

From these efforts, the Steering Committee recognized that there are both problems and opportunities for the United States (US) engineering profession, resulting from accelerating technological progress, rapidly evolving societal needs and current environmental imperatives. They further recognized that it is unclear who is taking a lead in the conversation, which led to the Omaha event. The purpose of this document is to reflect the conversation that resulted from the Future of the Engineering Profession Summit held on July 31st and August 1st in Omaha, Nebraska (see attached agenda and Summit workbook). Additional detailed notes, and pictures of the flip charts from the Summit, will be available in the near future on the Summit’s website.

Key Initial Messages

Opening Perspectives

As with every journey, this group agreed to meet with great expectations. Naturally all brought their own issues and opportunities and it was the responsibility of the facilitator (Kyle Davy) to tame this audience and channel the outcome into a workable solution. Despite the tendency to lean toward the viewpoints of our own sector of the engineering profession, by the end we were all aligned that this effort was much broader than our own unique perspectives. The “We” was naturally one of the focus areas throughout the conversation.

We established some self-imposed ground rules (attached) to guide our effort over the two days and, not surprisingly, still broke some of our own rules as we became more passionate about the topic. What we learned, however, is that we are all in the same boat and rowing in the same direction, even though we have a unique seat in the boat. By the end of the summit, we all agreed that everyone must have an avenue for their voice to be heard in the process with the idea that a rising tide floats all boats.

After small group exercises, the group identified their current perspectives around the engineering profession, both hopeful and troubled.

Most Hopeful Perspectives

- › Groundswell of interest in positively affecting the future of our profession
- › Increased collaboration on complex problems
- › The growth of technological solutions and knowledge will lead to new solutions and opportunities
- › The young people of today will be more highly motivated, better equipped, and more able to respond to changing technology and knowledge

Most Troubled Perspectives

- › There is still a lack of the collective “We” within the profession.
- › In many areas society (and engineers) are focused on tactical “short-term” thinking
- › There is a general devaluation of the professions, and technology is replacing many of our historical activities
- › The devaluation of the profession may make it difficult to attract the best and brightest, and our educational system does not focus on possibilities and creative problem solving
- › There is a loss of recognition of engineers as leaders, engineers are not sufficiently engaged in public policy, and there are forces that stifle innovation (e.g., regulations, slow reaction to societal needs, commoditization of our services)

Scenario Planning Exercises

To further evaluate the possible changes in store for the profession, the group engaged in scenario planning, using two possible future conditions (link to scenarios). The large group divided into smaller groups, and each of the small groups focused on one scenario. The whole group then discussed the different perspectives and thoughts raised by exploring these possible futures. Some common themes included:

- › There is a sense of urgency in doing the work necessary to proactively define our future
- › We need to broaden the stakeholders and increase collaboration within a broader system
- › There is a danger of over-regulation
- › In consulting, our clients are no longer a single organization, but truly society at large
- › We may need to develop new business and education models
- › As the speed of innovation increases, we must be willing to accept failures, and create white space for innovation to occur
- › It will become more important for technical people to also develop essential non-technical skills (communication, team building, etc.)

Canada's Engineering Change Lab (ECL)

ECL (see links below) is a multi-year, multi-stakeholder initiative to test and advance practical solutions designed to unlock the highest potential of the engineering profession in Canada. This initiative was launched in January 2015, under the leadership of Engineers Canada and Engineers Without Borders (EWB). These two groups were viewed as foundational to change in the profession. Engineers Canada serves as the licensing organization for individuals wishing to be called engineers (in fact, in Canada, without a license you cannot call yourself an engineer). Engineers Canada also accredits university programs (a function fulfilled in the US by an independent organization, ABET). Engineers Without Borders has a strong social benefit perspective; somewhat differently than in the US, it is more engaged with universities at a curricular level (i.e., it's not just a student "club" in the way that EWB is at many US universities).

Since its founding, more than 125 individuals from 70 organizations have participated in ECL. ECL has sought to balance the different "types" of organizations participating in the Lab, which in some cases has meant difficult decisions to limit the number of participants from any one type, to ensure that as many voices as possible can be heard. Participation in any one Lab is capped at 40-50; more than that does not work effectively in the social lab model used by ECL.

ECL views engineering as part of a complex system. Networks provide the opportunity for change in a complex system, and avenues to change are arrived at through constant experimentation, evaluating what has been learned to date, and iteration in response to learning and changes in the environment. As Mark Abbott (director and animator of the Lab) noted in his presentation, there are several existing methodologies to complex system change; he views using a guided approach to systems change as critical to ECL's success. ECL chose to work with Reos Partners, which uses a "social lab" methodology (two other Omaha participants use "cousin" approaches in their work [David Goldberg, Big Beacon; Liz Nilsen, Strategic Doing]).

ECL has had eight workshops to date; these workshops have been what ECL frames as "open exploration." In between workshops, the "secretariat" for the Lab (at EWB) has responsibility both for the logistics of the Lab and for leading the work in between workshops, which includes iterating and refining particular statements of the work, keeping communication channels flowing, and working with Reos Partners, the consultants leading the social lab process. The ECL has also launched a number of initiative teams that are working on specific aspects of the engineering profession or pipeline (i.e., diversity, innovation, ethics, university curriculum, K-12 outreach). Some of the initiative teams have gained traction and started moving on identified activities, others have sputtered.

Current Status: ECL is now transitioning into what they see as Phase 2 of their work, having spent the 2.5 years since their founding gaining clarity into the state of the profession and what ECL's unique role might be in shaping the future of the profession to best unlock the profession's higher potential. They have attracted additional funding to launch into this new phase, and at their next workshop (September 2017) will finalize foundational documents around their mission, purpose, values, etc.

Ongoing Efforts by Others Within the US

Other US groups were identified who are or may be working on related topics:

- › American Society of Engineering Education (Strategic Doing)
- › World Economic Forum
- › There is a danger of over-regulation
- › National Academy of Engineering (Grand Challenges)
- › American Society of Civil Engineers (ASCE) (third edition of the Body of Knowledge and a Pedagogy effort)
- › Water Environment Federation/American Water Works Association
- › Virtual Buildings (Global Collaborators)
- › American Institute of Architects (AIA) Technology in Architecture (TAP) committees
- › National Society of Professional Engineers

Both ASCE and National Society of Professional Engineers (NSPE) have started future-looking efforts, and representatives attended the Summit and provided an overview of each.

ASCE – Pedagogy

This group, consisting of university Department heads and chairs, is an ad hoc effort looking at the future of civil engineering. They are focusing on trends (e.g., declining enrollment), incorporating into the curriculum innovation and the compelling issues of today, diversification, and developing clearer links between ASCE's Body of Knowledge and accreditation.

NSPE

In 2016, NSPE began evaluating the future of the engineering profession, and has reached out to the National of Examiners for Engineering and Surveying (NCEES), engineers in private practice and government, and technology companies such as Google. In particular, they are focusing on the role of professional engineers (licensing), and the messaging and value proposition with respect to licensing. Upcoming task force work will include surveys, outreach and presentations to stakeholders. The final rollout is planned for July 2018.

Initial thoughts on Possible Actions

The initial conversations at the Summit surfaced several themes to which conversation would return over the two days, and many of these themes were repeated in the breakout groups on Day 2, as well as the discussion of next steps before the closing. Because these were initial conversations, the themes took the form of explicit or implicit questions:

- › How can we broaden the conversation to better reflect the current and future community of engineers – particularly given the relative lack of diversity in the room?
 - › Should our work be focused on a specific sector (i.e., consulting engineering), a specific discipline (i.e., civil engineering) or the entire profession? Our answer to this question will “bound” the challenges we are responding to.
 - › What is a reasonable scope for our work, particularly given that the US is 10 times the size of Canada in almost all respects (population, number of universities, number of engineers, etc.)?
 - › Do we have clarity on what we mean by “engineer”? Our definition will determine which people/groups should be a part of further conversations.
- American Society of Civil Engineers (ASCE) (third edition of the

Body of Knowledge and a Pedagogy effort)

- › Are we best-served by doing something new (a US version of the Canadian work) vs. partnering with other efforts or organizations (e.g., NAE, ASEE, NSPE)? Virtual Buildings (Global Collaborators

Focus Group Outcomes

On the second day of the Summit, the group reflected on the previous day's work, and furthered the discussion of "moving toward action" – what can/should be done now? We recognized that we would have to define the scope of our activities – should we focus on the engineering profession as a whole (the "whole system" approach), look at key subsystems of the profession, or become even more focused on specific problems? The whole system approach is inclusive of all engineering facets – licensure, education (K-12 and universities), technology, society, etc. It also includes all disciplines of engineers, working in all areas (e.g., industry, academia, consulting). The group decided this was a question of "and" not "or," and elected to focus on the whole system, as well as on several key subsystems. The group broke into small groups to discuss each of the different possible scope items – everyone self-selected their group of interest, and a champion for each group was identified (see attached list of focus group participation).

Possible Scope for Future Evaluation

- › **Whole System**
- › **Key Subsystems Identified for this group**
 - Future of Consulting Engineering as a Business
 - K-12 Education Related to Developing Future Engineers
 - Forces Driving Changes in the Profession
 - Public Policy

Whole System

The group had a lengthy discussion about what actions could or should be taken related to the future of engineering, as a profession. Key action items were developed.

The whole system group recognized, with input from Mark Abbott, that the future of engineering is a complex issue. It is challenging to even know the right problem to work on. If we focus on the symptoms and not the root causes, we could exacerbate the issue. Therefore, after recognizing the future of engineering is a complex issue, we agreed not to focus on the best solution but rather solutions that were good enough to learn from and adjust. Along those lines, it was agreed to further learn and build upon, the work done by Canada's Engineering Change Lab. The group recognized, however, that the US engineering system is much larger and more complex than that of Canada.

Whole System Group Key Outcomes

- › Collaborate with existing entities/stakeholders
- › Let go of past
- › Promote innovative thinking in school
- › Promote innovative thinking via technology
- › Empower younger employees
- › Learn from other industries – perceived problems not unique to our profession
- › Enable movement of best and brightest into influential, public serving positions
- › Embrace technology and recognize where it can be best utilized, and include as value add to consulting services provided
- › Leverage existing resources to maximize outcomes
- › Highlight or build upon where the human element will be most influential in the future of engineering
- › No norms/preconceived notions- welcome disruptors (innovators) and their ideas

Rather than seek an existing professional organization to sponsor, since they are member driven and have their own priorities and interests, the subgroup proposed the better approach would be to create a separate non-profit organization supported by stakeholders—professional organizations, National Academy of Engineering, tech companies (e.g., Google), industry, public/government/ clients etc. The fledgling non-profit organization would need to be incubated prior to operating independently. The University of Nebraska-Lincoln staff in

attendance volunteered to help spark the initiative and provide the space and resources needed to incubate the fledgling organization. Other key outcomes were also identified by the subgroup (See Box).

The subgroup proposed a general framework for the fledgling organization:

- › Charter/vision/“Boating” – pattern after the Canadian Engineer Change Lab model, the ECL currently has a BHAG (big hairy audacious goal) for its mission and vision. The ECL mission and vision could easily be adopted as our starting point. (In their discussion, the group used the term “boating” to recognize that rising tides lift all boats, and we therefore need to be inclusive of all sectors of the engineering community [all boats].)
- › Develop list of possible stakeholders (non-governmental organizations (NGOs), industries/technology companies, engineering societies and organizations, universities, etc.). This could lead to more subsystems of interest; some of these organizations may be engaging in related activities (American Society for Engineering Education [ASEE], ACEC, NCEES/State licensing boards, ASCE, NSPE, NAE, etc.).
- › Invite stakeholders to participate and work together on mission
- › Identify champions for subsystem working groups
- › Retain experts as participating resources (i.e., a facilitator, change management consultants, marketing, public outreach, etc.) The various stakeholders may have internal resources available to be donated to provide our needed expert services
- › Secure funding from sources such as National Academy of Engineering grants, Gates Foundation grants, other possible grants, crowd-funding sites, contributions from professional organizations

Polarities/Forces of Change

A polarities approach shifts the problem-solving paradigm from “either-or” to “both-and.” It expands the ability to see the bigger picture and potentially reduces unintended consequences and solutions that fail.

This subsystem working group would provide input to the Whole Systems group on topics related to the polarities in transformation of the engineering profession. The future of engineering is an “unsolvable” problem. However, we do know engineering is changing. David Goldberg explained that in identifying and managing an unsolvable problem, it is important to manage or leverage polarities. As a subsystem working group, it would provide input and guidance on opposites/polarities for managing change related to the future of engineering (see key outcomes). This subsystem group would develop polarity maps and manage polarities by feeding information in and out of the whole systems group. It can also expand its participants as needed and would report to the organizing group.

Polarities of Change Key Outcomes

- › **Polarities**
 - Teamwork vs individual work
 - Autonomy vs control
 - Obedience based learning vs possibility based learning
 - Continuity vs innovation
 - Regulation of engineering vs de-regulation of engineering
- › **Forces of Change**
 - Information/connectivity
 - Commoditization of profession and changes in economic model
 - Other disruptive forces
- › **Goals**
 - Develop understanding of possible changes
 - Conduct more scenario planning

K-12/CAPS/Workforce

It is not possible to look at the future of engineering without thinking about how we are educating those who will someday become engineers. We want to stimulate them into thinking about their own future and how they will serve an ever-increasing need to support critical human infrastructure. The group agreed that they should be part of the discussion to help define their future. In fact, one of the participants in the initial group is a high school teacher that teaches the principles of engineering. He identified the need for businesses to collaborate with students of all ages to help them become problem solvers and develop the engineered solutions of tomorrow.

Currently there is a network of schools around the country that have adopted this philosophy of business and education collaboration. One of the groups is called the Center for Advanced Professional Studies (CAPS, www.yourcapsnetwork.org) which is in several states and school districts. These are not state-mandated curriculum, rather they are curriculum established by the schools, focused on project-based learning with corporate partners, to facilitate that experience. Many of these schools have an engineering track specifically using Project Lead The Way (PLTW) as the focus of the curriculum.

It was the opinion of this small group that we should further explore how to communicate to the K-12 programs the coming changes in our profession to help us recruit, retain older engineers to serve as mentors in our field and brand the good work that we do as engineers.

The Future of Consulting Engineering

With so many consultants attending the Summit, a subgroup focused on the future of that business. They defined the industry as engineers who work for clients on projects in the built environment, including infrastructure. The group recognized that the changes to our industry are numerous and are going to continue (digital technology, commoditization, alternative project delivery systems, competition from unqualified organizations). In order for these businesses to thrive, we must adapt to these changes, help our clients adjust to these changes, and perhaps change the model from being reliant on selling hours. The group also recognized that licensing isn't just necessary for the protection of our profession and businesses, but the ultimate need is for the protection of society.

K-12/CAPS Outcomes/Workforce

- › Work with existing programs
- › Foster interaction between practicing engineers and schools
 - K-12 adapting more willingly
 - College level may be more difficult
- › Engage in workforce development
- › Build partnerships with high school and college students (e.g., Habitat for Humanity)
- › Tie gaming skills to real world applications
- › Focus more on communication/soft skills (including team building)
- › Connect “fun” technology (e.g., gaming, drones) to engineering solution
- › Interact with existing programs (CAPS, Future Cities, SAME, ACE Mentor)
- › Develop project based “hands on” programs

Public Policy

To affect positive change in the future, engineers need to be more engaged in public policy, at all levels (federal, state and local). In our current climate, scientific and engineering principles are not always appropriately considered during policy discussions. The group expressed concern that this leads to short-term solutions, focused on immediate needs, rather than long-term approaches that consider life-cycle parameters and that recognize our limited resources. The group also developed a set of guiding principles, and identified key action items:

- › We need to change the public policy tone and focus – we can help do that
- › We must be careful to be seen as taking this action out of societal concerns, not out of self-interest
- › There is a current leadership vacuum, and we have a responsibility to help fill that void
- › The only way to have more influence in policy discussions is to get involved
- › We must be strategic in our approach
- › We should focus at the local level to start public participations career paths

Increased Public Policy Key Outcomes

- › Develop a strategic plan for this subsystem (lead by design), with the goal of increasing the participation of engineers in public policy leadership and to encourage public service
- › Investigate and be clear on the rules surrounding lobbying activities
- › Consider forming a new type of organization focused on recruitment, education and training of engineers to help take on this role
- › Evaluate forming a PAC dedicated to supporting engineers as political candidates

Next Steps/Call to Action

The larger group then developed a series of next steps to be completed. One of the first steps is for the organizing committee to create a Chartering Group. This group will:

- › Draft an initial mission/vision statement.
- › Evaluate the path forward.
- › Develop an initial budget and look at potential sourcing options.
- › Begin to take the necessary actions to create a fledgling organization. The entire organizing group expressed interest in meeting again soon, likely in Omaha, to assess progress on identified action items and steps for continuing to move forward. The organizing committee will reconvene in early September to identify possible dates for this meeting. Other specific tasks are discussed below.

Use Canada's ECL as a Model/Starting Point

There was significant discussion regarding the scale difference between the Canadian ECL and a similar effort in the US. Mark Abbot pointed out that there is a factor of approximately 10 in everything in the US – 10 times more engineers, 10 times more colleges/universities, 10 times more population, 10 times more industry (volume and diversity). However, the group agreed that the ECL provides an excellent starting point, and that we should be synergistic in our future work.

Beginning with ECL as a starting point benefits this effort by orienting discussions toward future scenarios without requiring participants to retain historic relationships, assumptions, and other changeable elements. The ECL model will help encourage experimentation and an interconnected investigation of future possibilities. Challenges will include managing the size and complexity of the group to advance the work quickly while still addressing the full scope of engineering in the US.

Continue Subsystems Committee Work

The subsystems committees (K-12, Consulting Engineering, Polarities/Forces of Change, Public Policy) all agreed that they would like to continue working on their identified action items in the interim. The champions of the groups will reach out to the others interested in their subsystem to define paths forward. The champions also agreed to share progress and findings of committee work with the organizing group for inclusion in the information exchanged at the next meeting in Omaha.

Broaden the Stakeholder Group

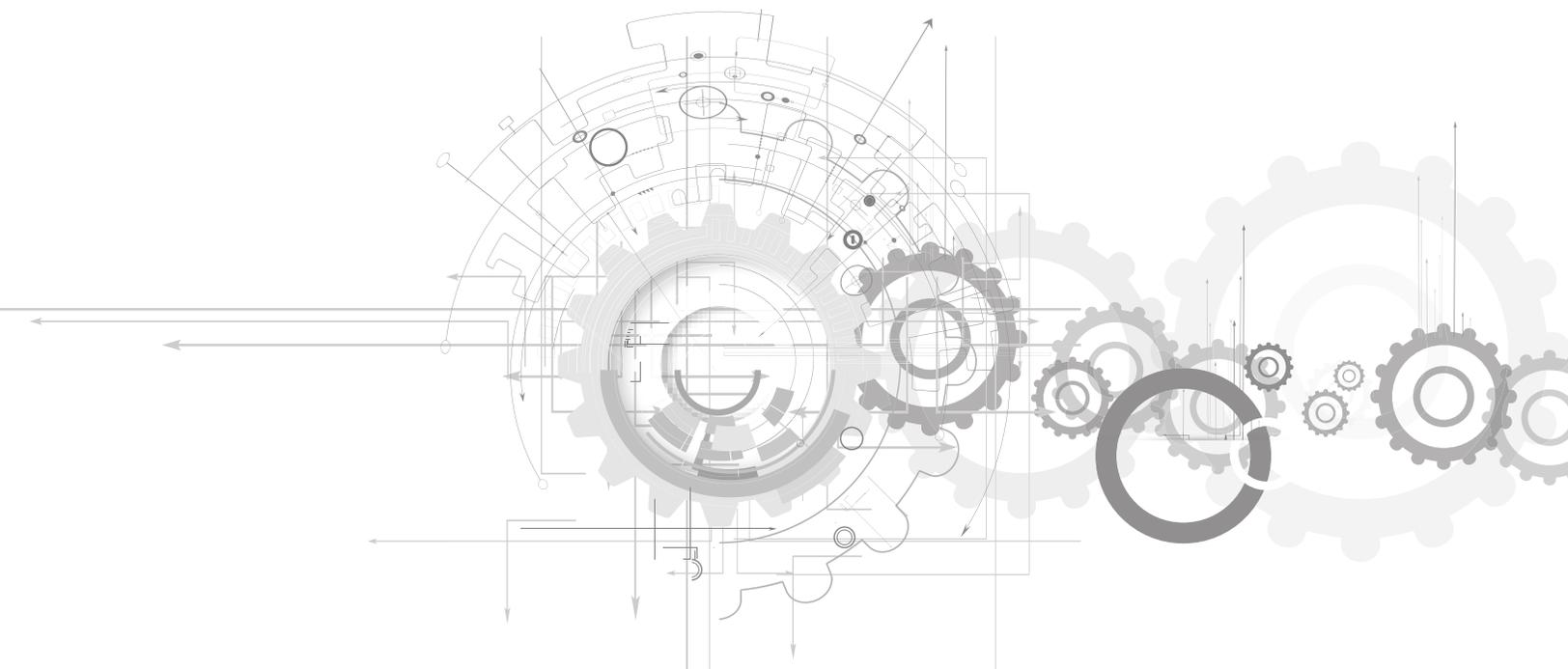
The organizing committee, Chartering Group and attendees should begin identifying other interconnecting groups to broaden our view of the engineering world. This could result in additional subsystems activity. This stakeholder group should also include the owners of the built environment and the users of our engineered systems. In broadening the stakeholder group, care should be taken to incorporate a broad range of perspectives, expertise, experience, geography, scope of practice, etc. Outreach is necessary to confirm that the other groups and individuals are interested in participating in future work.

Form a Communications Committee

We agreed to form a communications committee (list of members attached). This committee would work on the following activities:

- › Prepare a summary of the work done at this Summit (this document)
- › Develop a “concept note” to provide to others to use in the effort to broaden the stakeholder group
- › Develop a communications plan for establishing communications channels, and to provide materials for those engaged in outreach to speak in “one voice”

In addition, the group recognized the need to develop a website. The University of Nebraska has volunteered to lead this effort, with help from Nancy Pridal. In addition to providing a collaboration site and to be an “open source” resource for others interested in the effort, the website will include resources that are useful in documenting and leveraging our existing knowledge, whether that be the history of engineering or supporting information (cultural, economic, change processes, technology, etc.)





**FUTURE OF THE
ENGINEERING
PROFESSION
SUMMIT**



2017
OMAHA, NE

FUTURE OF THE ENGINEERING PROFESSION SUMMIT

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Mark Abbott, PE, MBA, spent 15 years working in the heavy industrial consulting engineering board in Vancouver, Canada, before leaving to join the executive team of Engineers Without Borders Canada board in Toronto 6 years ago. Three years ago, Mark transitioned to help launch and become the founding director (animator) of the Engineering Change Lab, which is a collaborative platform comprised of senior leaders representing 40 + organizations from across the engineering community in Canada who are working together to understand and unlock the higher potential of engineering contributions to society.

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Kurt Fraese, LG retired this year from a 35-year career as a consulting geologist with primary practice in environmental assessment and remediation of hazardous materials. His career included six years with Woodward Clyde Consultants in the San Francisco Bay Area and 29 years with GeoEngineers in Seattle, WA where he served as CEO / President for 10 years. Kurt is also a graduate of ACEC's Senior Executives Institute (SEI), a former President of the Geoprofessional Business Association (GBA) and the Mountains to Sound Greenway Trust. He currently provides business advisory services.

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Edwin Friedrichs is a Senior Principal at Walter P Moore. A member of the firm since 1977, he offers a strong background in master planning, infrastructure design, building site plan design, and traffic engineering studies and design. Edwin's experience also includes regional mobility planning, Capital Improvement Plan preparation, funding options, and public hearings and presentations.

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Derek Gardels is a Project Engineer at HDR working on a number of diverse projects and infrastructure programs, ranging from indirect potable reuse in the West to combined sewer overflow programs in the Midwest. As an AAAS Science & Technology Policy Fellow at the Institute for Water Resources (U.S. Army Corps of Engineers), Derek recently explored interests in alternative financing, public-private partnerships, and future/technological trends in the water resources and construction sectors.



David Goldberg, PE
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In 2010, Dave Goldberg, a trained civil engineer (hydraulics) and registered PE (PA), resigned his tenure and distinguished professorship at the University of Illinois to help transform engineering education around the world. His book *A Whole New Engineer* recommends a practical path toward greater emotional awareness and engagement that will help revitalize the culture of engineering education, and possibly the profession itself.

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Mark Golden FASAE, CAE is the Executive Director of the National Society of Professional Engineers. He has previously served as the executive director of the National Court Reporters Association and in key leadership positions with the Personal Communications Industry Association and the Association of Telemessaging Services International. Mark is a Certified Association Executive and a Fellow of the American Society of Association Executives.





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Rick Guerra, PE is President and CEO of Jose I. Guerra, Inc., a full-service consulting engineering firm based in Austin, Texas. The firm provides a comprehensive range of high quality civil, structural, mechanical, electrical, and plumbing engineering services throughout Texas.

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Gil Hantzsch, PE is the President and CEO of MSA Professional Services, Inc. Based in Baraboo, Wisconsin, MSA is a 350-person full-service firm offering engineering, architecture, planning and surveying services from 16 offices in Georgia, Illinois, Iowa, Minnesota, Texas, and Wisconsin.



Bradley Hardin
Chief Technology Officer
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Bradley Hardin provides strategic guidance, investment governance and innovation direction for new and disruptive technologies as the Chief Technology Officer at Black & Veatch. He is a LEED accredited architect, and has experience in construction management, technology integration, business development/procurement, and team management.



Michael Hotaling
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Michael Hotaling provides professional consulting services to airport sponsors. He leads C&S Engineers, Inc.'s aviation practice of more than 100 technical and support personnel in offices in Arizona, California, Florida, Michigan, New York, Ohio, Pennsylvania, Rhode Island and Texas. Michael's areas of technical expertise include, program management, master and environmental planning, community outreach, noise mitigation programs and stakeholder engagement.

Elizabeth (Libby) Jones, Ph.D.
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Dr. Libby Jones, Ph.D is a civil engineering faculty member at the University of Nebraska-Lincoln (UNL). Her areas of specialty are traffic engineering, humanitarian engineering, service learning, and engineering education. Dr. Jones has received numerous awards for her leadership, mentoring and teaching including most recently the 2015 Holling Family Distinguished Teaching / Advising / Mentoring Award from the University of Nebraska-Lincoln College of Engineering and the 2014 Engineers Without Borders-USA Peter J. Bosscher Faculty Advisor Award for Outstanding Leadership.



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STEM Facilitation
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Lee Kallstrom, Ph.D. has worked with high school engineering students for the past 25 years. He taught at Omaha North High Magnet school in the engineering magnet for 18 years, retired, and now facilitates a STEM program in CAPS at Omaha Westside Schools. Lee's primary passion is providing real-life experience in architecture, engineering, and design.

Matt Kennedy
Environmental Service Leader
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Matt Kennedy leads VHB's Water Resources Practice. He has in-depth experience in hydrologic and hydraulic design and modeling, stormwater and surface water management, water quality modeling and analysis, stormwater permitting, and flood control and drainage design. Matt has prepared stormwater master plans and studies for drainage basins ranging in size from less than 100 acres to greater than 6,000 square miles.



Lance Kinney, Ph.D., PE
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Lance Kinney, Ph.D., PE has been with the Texas Board of Professional Engineers for over 15 years and is responsible for all agency programs and activities, including legislative, rule, budget, and policy issues, and represents the Board at statewide, national, and international functions. He also gives licensing and ethics outreach presentations all over the state at universities, companies, and associations.

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Lisa Larrabee is responsible for the development and implementation of Harris & Associates's strategic plan. Her focus is on translating market and client needs into the firm's positioning, emphasizing leadership development as the firm's long-term differentiator.

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Dr. Daniel Linzell is in his fourth year as Chair of the Department of Civil Engineering. He spent 14 years in the Civil and Environmental Engineering Department at Penn State, including a year on sabbatical at the School of Engineering at Tecnun, the Technological Campus of the University of Navarra in San Sebastian, Spain. Dan received his Ph.D. and Master's degrees from the Georgia Institute of Technology, and his Bachelors of Science in Civil Engineering from The Ohio State University.



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Patty Mamola, PE has served nine years on the Nevada Board of Engineers and Land Surveyors. Currently serving as the deputy chair of APEC Engineers and her past role as the NCEES President, Patty strives toward increased diversity and improving mobility for engineers nationally and internationally. She has expertise in the private and public sector engineering industries and in construction management.

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Andrew McCune has worked with municipalities, utility authorities, departments of transportation, energy companies, and other types of clients in various roles since he began his engineering consulting career in 1987. As Wade Trim's President and CEO, Andrew has led projects in Michigan, Ohio, Pennsylvania, New York, Florida, Nebraska and Texas.





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Mike McIntosh, PE, CFM is the Public Practice Lead for Lamp Rynearson's Design Group in its Omaha, Nebraska office. Mike has helped lead many large projects for the company including the development of the Omaha Century Link Center, projects at Omaha's Henry Doorly Zoo, and several large conveyance projects for Omaha's Combined Sewer Overflow (CSO) program. He is active in the Association of Floodplain Managers (ASFPM) and American Council of Engineering Companies (ACEC) Nebraska, and is currently serving on the board for Nebraska Make-A-Wish.

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Mike McMeekin, PE, ENV SP is President of Lamp Rynearson, an engineering, landscape architecture, and surveying firm headquartered in Omaha, Nebraska with additional offices in Fort Collins, Colorado; Lakewood, Colorado; and Kansas City, Missouri. Mike is a graduate of the American Council of Engineering Companies' Senior Executives Institute, an advanced management, leadership, and public policy training program for current and emerging leaders of engineering and architectural firms. He was also recently selected to serve on the National Executive Committee of the American Council of Engineering Companies.



Craig Musselman, PE, F.ACEC
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Craig Musselman, PE, F.ACEC is a consulting engineer with 43 years' experience with the last 30 years as the founder and president of CMA Engineers, based in Portsmouth, New Hampshire. As professional hobbies, Craig serves as a member of the board of directors of ABET, and has served on his state's PE Board, chaired national licensure committees for two organizations, and served as a local elected municipal official for the past twelve years.



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Liz Nilsen and the Purdue Agile Strategy Lab help organizations apply the principles of “agile” to collaborative challenges, including the challenge of making engineering education relevant to the needs of the 21st century. Liz was the senior program director for the NSF-funded Pathways project, in which she guided 50 university teams in incorporating innovation/creativity/entrepreneurship content into undergraduate engineering education. She is in the midst of follow-up research to learn what those teams have accomplished — and how.

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Charles O'Donnell, III, PE has been a Municipal, Civil and Environmental Engineering Project Manager and Project Director at George, Miles & Buhr, LLC for 28 years. Other interests for Charles include teaching, coaching, friends and family.



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Bob Pekelnicky is a Principal with Degenkolb Engineers in San Francisco where he specializes in advising clients on making their facilities more resilient to earthquakes and other natural hazards and is a member of the firm's board of directors. He chairs several national standards committees focused on performance based design, evaluation and retrofit of new and existing buildings, and has been retained numerous times as an expert by the federal government to develop their building standards and guidelines.

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Nancy Pridal, PE, ENV SP is a Senior Vice President and Board Member for Lamp Rynearson, as well as a civil engineer with a Master's Degree of Organizational Leadership. She currently serves on the Heartland 2050 Executive Committee and is Chairperson of the Natural Resource Committee. Nancy is a member of the University of Nebraska Civil Engineering Advisory Board and a past member of the College of St. Mary Business Advisory Board, as well as a member of CREW (Commercial Real Estate Women) Omaha Metro.



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Doug Reed is President of Foster Growth, and proven as an A/E/Env owner. Best Practices include partnered implementation with a certainty of success. Doug has three decades of engineering which were followed by business growth practice.

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Marilen Reimer has been with ACEC Colorado for 26 years and its executive director for 10 years. She served as NAECE's president from 2014-2015. Marilen currently serves on the ACEC Management Practices and Risk Management Committees.

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Tom Roberts, PE, F.NSPE is the 2017-18 President of the National Society of Professional Engineers (NSPE). He has more than 40 years experience in planning, organizational development and leadership training programs. Tom was responsible for engineering recruitment and leadership development at Kansas State University for 21 years, and is Assistant Dean Emeritus of KSU's College of Engineering.



Clinton Robinson
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Clint Robinson, Director of State & Local Government Affairs, has worked at Black & Veatch for 33 years. He is also very engaged in the areas of health, education and innovation in his community and across the country.

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Kyle Schneweis, PE serves as the Director of the Nebraska Department of Transportation (NDOT) and leads the agency's employees in planning for and addressing Nebraska's transportation needs. Prior to the NDOT, Kyle was a partner at an industry-leading transportation policy and financial consulting firm where he provided strategic planning and performance management expertise to more than twenty-five national, state and local clients. He has significant experience in the public sector, and served at the Kansas Department of Transportation.





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Raj Sheth, PE, S.E., F.ACEC, F.ASCE is the CEO and Chairman of the Board of Directors of Mead & Hunt, Inc., a position he has held since 1994. Raj has more than 45 years of experience in consulting engineering and architecture business. Mead & Hunt (ranked at ENR 141) is an employee-owned multi-discipline national firm providing consulting services.

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Elizabeth Stolfus, PE, is President of Stolfus & Associates, Inc., a Colorado transportation engineering and planning consulting firm. Her professional interests include linking transportation systems with community planning, building multi-disciplinary programs and teams to improve highway safety, and implementing thoughtful engineering designs that accommodate every mode of travel. Elizabeth focuses on developing solid transportation decisions, projects, and processes by establishing inclusive participant settings, asking the right questions, and sharing information.



William M. Stout, PE
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Bill Stout, PE, is a Principal Consultant with Gannett Fleming Valuation and Rate Consultants, LLC, a subsidiary of Gannett Fleming, Inc. Bill provides internal training to staff and assistance in client studies related to public utility depreciation and cost of service, fields of practice that occupied much of his career. Early in 2017, he retired as Chairman of the Board and CEO of Gannett Fleming, Inc. In 2016, Bill received the American Council of Engineering Companies (ACEC) Chairmen Emeritus Award.



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Kodi Jean Verhalen, PE, Esq., F.NSPE was the 2016-17 President of the National Society of Professional Engineers (NSPE). She is an associate in the Energy Section at the law firm of Briggs and Morgan, P.A., where she works with many P.E.s, engineers-in-training, and engineers on large energy infrastructure projects both from a regulatory and environmental perspective. She is licensed to practice law in Minnesota state and federal courts, and Wisconsin state courts, and is a licensed P.E. in Minnesota.

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Bill Wallace has over 40 years of experience in environmental engineering. He has served on multiple engineering company and NGO boards, and is the recipient of the Engineering News-Record 2013 Award of Excellence, and the American Society of Civil Engineers' 2014 Presidents medal for his work on the Envision™ sustainable infrastructure rating system.



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David Winter is a geotechnical engineer with Hart Crowser, a Northwest-based 100-person geo-environmental firm with offices in Washington, Oregon, Alaska, and Hawaii. David has been with the company for 27 years.

Agenda

Summit on The Future of the Engineering Profession

Monday, July 31, 2017

8:00 - 8:30	CONTINENTAL BREAKFAST
8:30 - 9:30	INTRODUCTION <ul style="list-style-type: none">• Welcome & Expectations
9:30 - 10:15	OPENING PERSPECTIVES
10:15 - 10:30	BREAK
10:30 - 12:00	EXPLORING POSSIBLE FUTURES
12:00 - 12:45	LUNCH
12:45 - 1:45	ASSESSING THE CURRENT TRAJECTORY
1:45 - 2:00	BREAK
2:00 - 3:30	LEARNING FROM THE ENGINEERING CHANGE LAB
3:30 - 3:45	BREAK
3:45 - 5:00	MOVING TOWARD ACTION <ul style="list-style-type: none">• What can (should) be done now?
6:00	DINNER <ul style="list-style-type: none">• Cantina Laredo 120 S 31st Avenue <i>Cash Bar</i>

Agenda

Summit on The Future of the Engineering Profession

Tuesday, August 1, 2017

7:30 - 8:00	CONTINENTAL BREAKFAST
8:00 - 10:00	MOVING TOWARD ACTION <ul style="list-style-type: none">• Chartering a “Deep Dive” by the Engineering Profession
10:00 - 10:15	BREAK
10:15 - 11:15	ACTION PLANNING FOR NEXT STEPS
11:15 - 12:00	CLOSING REMARKS
12:00	LUNCH (<i>Boxed</i>)

Summit On
The Future of the
Engineering Profession

Omaha, NE

July 31 & August 1, 2017

Introduction

Scenario Planning Exercise

Exploring Possible Futures

Step One: Read the Scenarios.

Step Two: Divide into small groups, with each group assigned one of the pair of future scenarios.

Step Three: In your small groups consider the following questions:

- *What is your overall impression of this future?*
- *What particularly stands out?*
- *What role did the engineering profession play in shaping this future?*
- *What lessons can you take away about engineers and the future of the engineering profession from this scenario?*
- *Other insights relevant to our work at the summit?*

Scenario Planning Exercise *(Continued)*

Exploring Possible Futures

Step Four: Whole Group Report & Discussion

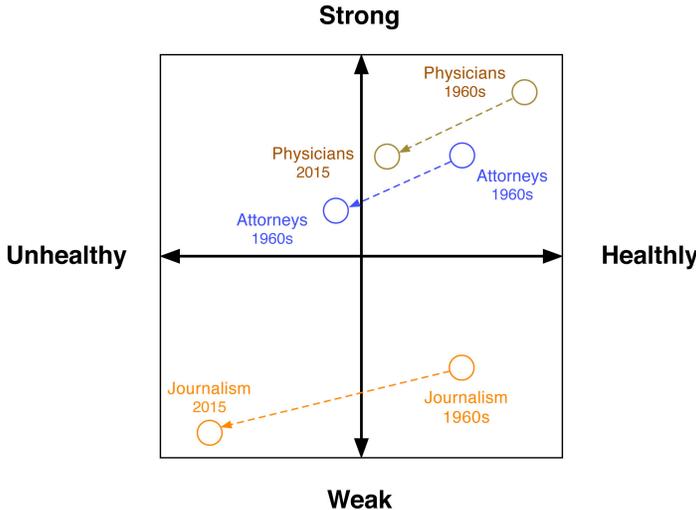
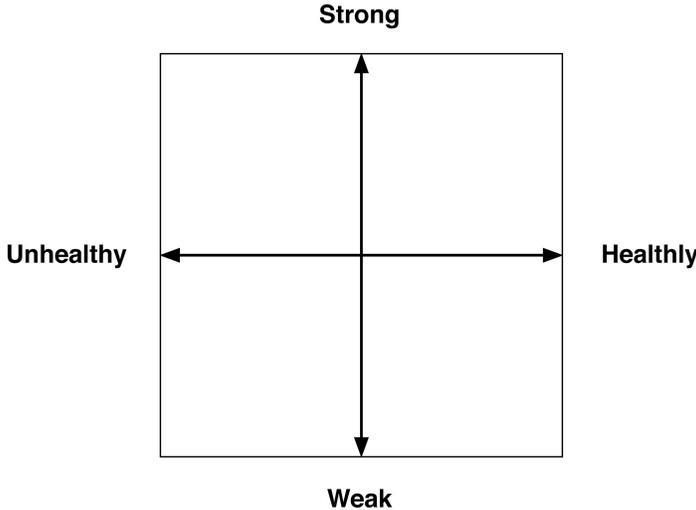
Assessing the Current Trajectory

Which trajectory (represented by the future scenarios) is the engineering profession currently on?

Which trajectory would you like to see the profession headed toward?

Checking Vital Signs

The Life & Death of Professions



Checking Vital Signs

The Life & Death of Professions

Strength Factors

- Professional authority & trust of clients/community
- Autonomy & control of the workplace
- Monopoly power with respect to jurisdiction
- Control of entrance/exit of practitioners (education & licensing)

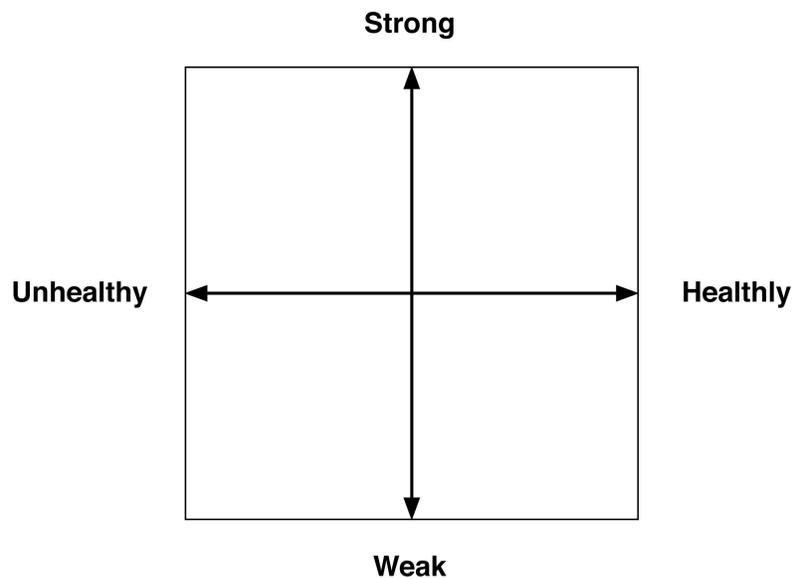
Symptoms of Health

- Alignment with respect to the professional domain (*purpose, aspirations, ethics, etc.*)
- Expansion of the domain through knowledge creation and innovation
- Constructive internal competition with respect excellence (*proficiency & reputation*)
- Growth in number of practitioners (*particularly # of young practitioners*)
- Diversity of practitioners
- Constructive internal competition with respect to monetary rewards (*market power*)
- Ability of practitioners to engage in activities that exhibit the highest sense of professional service and responsibility (*flow experiences*)
- Ability of practitioners to grow and pursue mastery of the domain

Checking Vital Signs

The Life & Death of Professions

How would you assess the vitality of the engineering profession?



Learning from the **Engineering Change Lab**

Moving Toward Action

What can (should) be done now?

What could (should) you as leaders do?

Possibilities for Action

“The future is created one room at a time, one gathering at a time...the small group is where transformation takes place. Large-scale transformation occurs when enough small group shifts lead to the larger group change.”

Peter Block in Community: The Structure of Belonging

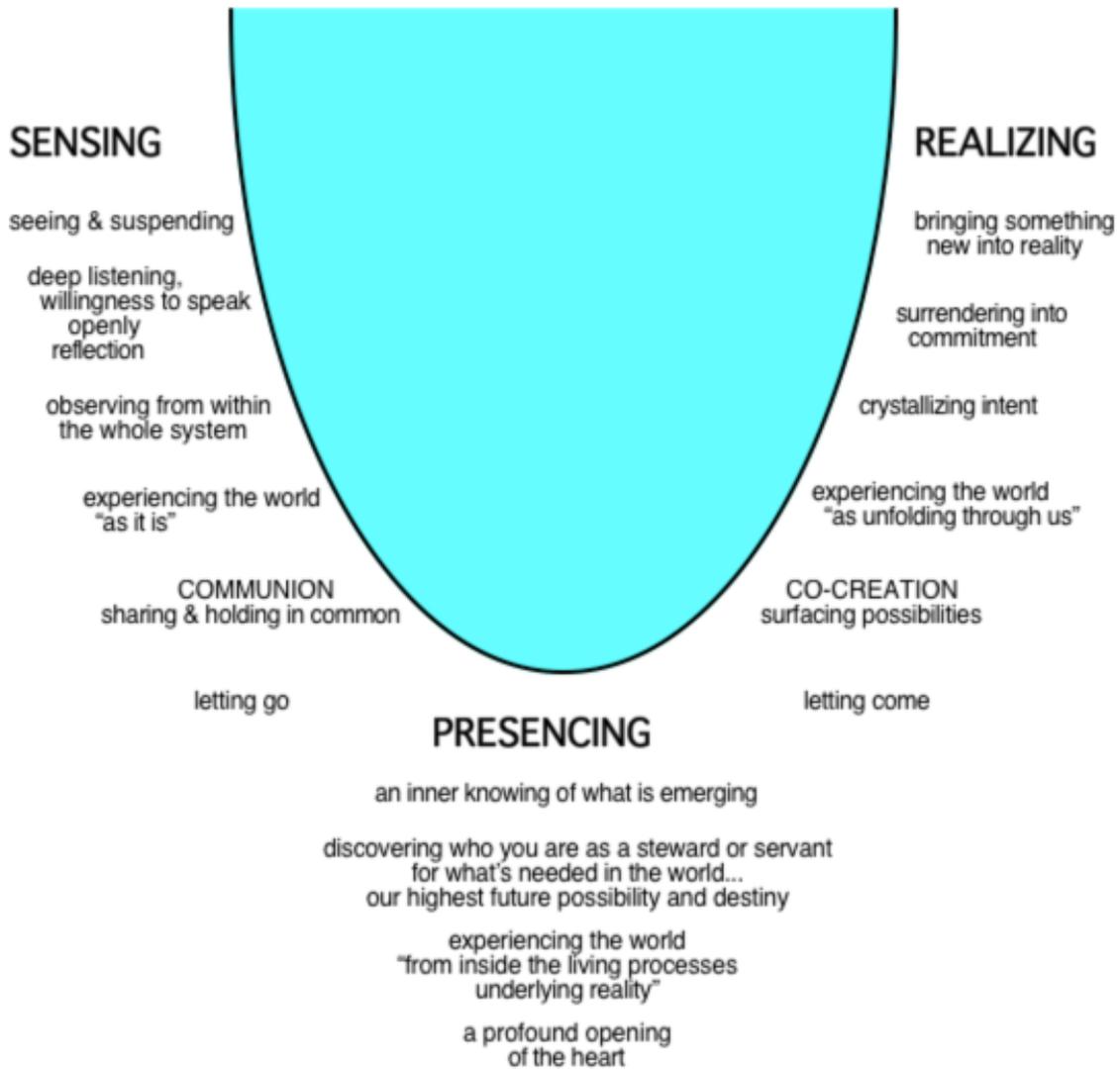
“Never doubt that a small group of thoughtful, committed citizens can change the world; indeed, it's the only thing that ever has.”

Margaret Meade

Chartering a “Deep Dive”

Into the Future of the Engineering Profession

Deep Dives: Theory “U” & Presencing



*From: Presence: Human Purpose And The Field Of The Future
Peter Senge, C. Otto Scharmer, Joseph Jaworski, & Betty Sue Flowers*

Action Planning for Next Steps

Closing Remarks

Omaha 2017 Summit Ground Rules

- Limit “sound bites”
- The opinions and information shared by the participants should be considered Confidential – “Vegas” rules apply
- Be open minded
- Be fully present
- Engage in constructive conflict
- Respect diversity
- Capture diverse ideas
- Development actual outcomes

ECL Links

ECL overview: <http://www.engineeringchangelab.ca/en/home/>

ECL videos: <https://www.youtube.com/playlist?list=PLI6BazTq8ZyEfGqFDDXAXIJBgcPt3JV1Z>

ECL workshop reports: <https://drive.google.com/drive/folders/0B1jDw1GncjprQ1JjTklHYU50T3M>

Summary of ECL's work to date:

<https://docs.google.com/document/d/1TKZEc7dcsHPZ1x07hs9fXRqtW3hRA8VSAr5rjFM-vwc/edit>

Strategic Doing: <http://www.agilestrategylab.org> <http://www.strategicdoing.net>

Big Beacon: <http://bigbeacon.org/>

Omaha 2017 Focus Group Participants

Whole Systems – led by Patty Mamola

Nancy Pridal
Cody Verhalen
Mark Abbott
Daniel Linzer
Kurt Fraese
Elizabeth Stolfus
Robert Pkelnicky
Tom Roberts
Jose Guerra
Lance Kinney
Laurie Dreyer
Lisa Larrabee
Liz Nilsen

K-12/CAPS – led by Clint Robinson

Mike MacIntosh
Lee Kallstrom
Daniel Linzell
Charlie O'Donnell

Public Policy – led by Edwin Friedrichs

Mike McMeekin
Lauren Evans
Derek Gardels
Bill Stout
Craig Musselman
Bill Wallace
Kyle Schneeweis

Polarities of Change – led by David Goldberg

Brett Binkley
Matt Kennedy
Michael Hotaling
Libby Jones

Consulting Engineering – led by Stacy Bartoletti

David Winter
Terry Atkins
Michael Cline
Eric Flicker
Gil Hantzsch
Andy McCune
Raj Sheth
Marilen Reimer

Communications Committee

Chair - Lauren Evans

Clint Robinson

Laurie Dreyer

Daniel Linzell

Elizabeth Stolfus

Libby Jones

Patty Mamola

Liz Nilsen