# National BILT Meeting Minutes

**CHAIRPERSON:** Matt Glover, Le-Vel  
**MEETING DATE:** Tue, Nov 9, 2021  
**MEETING TIME:** 8:30am-10:00am Central  
**MEETING PLACE:** Zoom  
**RECORER:** Mark Dempsey  
**RECORDING:** Available upon request  
**PREVIOUS MEETING:** Aug 10, 2021

## MEMBERS PRESENT

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<tr>
<th>BILT:</th>
<th>CCN educators:</th>
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<tr>
<td>Aaron Burciaga, ECS</td>
<td>Marilyn Barger, FLATE</td>
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<td>Susan Coefield, VMware</td>
<td>Bryan Bennett, Kirkwood</td>
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<td>Carolyn Corbin, Center for the 21st Century</td>
<td>Ericka Bernhardt, Gateway Technical</td>
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<td>Ivor Flannery, Redline</td>
<td>Laura Berry, North Ark</td>
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<td>Maurice Gibson, Wiley</td>
<td>Renee Blackshear, Texas State</td>
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<td>Matt Glover, Le-Vel</td>
<td>Jeannie Copley, Northern Arizona University</td>
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<td>Joe Hillis, ITDRC</td>
<td>Rafat Elsharef, Milwaukee Area Technical College</td>
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<td>Dan Huff, Citi</td>
<td>Steven Fogg, Salt Lake Community College</td>
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<td>Tu Huynh, Comerica</td>
<td>Ervin Frenzel, Collin College</td>
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<td>Scott Veibell, Cisco</td>
<td>Ernie Friend, FSCJ</td>
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<td>Glenn Wintrich, RDM Innovations</td>
<td>Richard Grotegut, Bay Area Community College Consortium</td>
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<td>Kim Yohannan, Alteryx</td>
<td>Naser Heravi, College of Southern Nevada</td>
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<td>Susan Hoggard, Tulsa Community College</td>
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<td>Abbas Imam, Volunteer State Community College</td>
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<td>Kyle Jones, Sinclair</td>
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<td>David Keathly, University of North Texas</td>
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<td>Dante Leon, Daytona State College</td>
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<td>Patrick Logue, South Plains College</td>
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<td>Rajiv Malkan, Lone Star</td>
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<td>Brenden Mesch, Collin College</td>
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<td>Ryan Murphy, Sinclair</td>
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**CTC staff:** Ann Beheler, Mark Dempsey, Christina Titus
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<th>Agenda items</th>
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| **Matt’s trends**  
(Matt Glover) | Matt offered a number of introductory talking points:  
* The Bureau of Labor Statistics recently reported that by 2030, all Baby Boomers will be at least 65. This shift will lead to a huge focus on automation. Forrester predicted that AI, machine learning, and automation will create 9% of all new jobs by 2025. Specifically, that report referenced jobs like robot monitoring, data science automation, and content curators.  
* Matt said that the median annual income for STEM workers is $84,880 while the median for non-STEM workers is $37,020.  
* Matt discussed also the emerging trend of “STEAM” that adds the “A” for arts to the traditional STEM fields of science, technology, engineering, and mathematics by emphasizing visuals and creativity. |
| The 2030 workplace  
(Matt Glover) | From the chat box: STEAM pathways have been a staple for high schools in California for years. Digital media is the number one high school CTE program and a significant contributor to the development of STEAM.  
From the chat box: The reason the "A" is important is that we want well-rounded, capable communicators who have developed an emotional intelligence, too. One particular way employers benefit from this emphasis is improved soft skills.  
* Among technology trends of note that expanded in 2021: The **AI market** – a $57B business in 2021 – is projected to grow into a $190B industry by 2025. **Quantum computing** revenues are projected to top $2.5B by 2029. **Robotic process automation** developers can earn up to $534,000 a year. The **edge computing** global market will reach $6.7B by 2022, while virtual reality will grow to $209B. **Cybersecurity** expenses topped $6T (trillion with a T) in 2021. The average salary for a **blockchain** developer is $469,000. Global spending on IoT will be $1T in 2021. By the end of 2021, more than 50 operators in 30 countries will be launching **5G** services. With **cryptocurrency** moving past $3T, it’s no longer a fringe technology. Matt points to all of this as a way of showing technologies are colliding together. |
| *(Note: Article links have not been included in this text.)* | Matt next referenced a study that listed the top ten ways the 2030 workplace will be different. Article: [https://www.simplilearn.com/future-of-work-article](https://www.simplilearn.com/future-of-work-article)  
* The best workplaces will offer choices. No more assigned seating.  
* Workers will have more opportunity to collaborate, which may mean you don’t need to build large costly businesses. Companies will be smaller.  
* Work will thrive in teams rather than led by dictatorships. There will be less hierarchy.  
* A renewed emphasis on wellness and health, which may mean better lightning, areas of relaxation, more pets.  
* A new “chief of work” position may develop – someone who will set the organization’s culture.  
* Flexible floor plans could be tied to sensor data and AI so that workers are told where to go each morning when they arrive. Today you’re on the fifth floor and tomorrow you’re on the seventh.  
* Workers may no longer have assigned desks. Instead, they’ll sit wherever there is an empty seat. There may even be a simulation element that connect workers together online. Matt wondered about the elimination of ergonomically customized desks and chairs.  
* Workers will have robot helpers like Siri and Alexa to help sort email, schedule meetings, and run spreadsheets. |
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<th>Service Mesh and containers (Glenn Wintrich)</th>
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* Long-distance brainstorming will be more common with meetings across time zones and locations.
* Virtual reality headsets provide a “water cooler” venue for informal work gatherings.

Glenn discussed service mesh, describing it as the “glue that holds everything together.” The definition of service mesh: configurable, low-latency layers designed to handle high-volume network services. Glenn noted that L2 and L3 are right in IT students’ wheelhouse. Service mesh manages service-to-service traffic both within the data center or between data centers. Glenn noted also that service mesh ties together microservice software. A 2020 DevOps survey suggested that 17% of businesses have adopted service mesh across their entire IT department, with another 20% adopting it as a sub-level. This technology connects workloads from multiple companies into a single collaborative mesh. Think of a rideshare app and all of the functions and services provided to the customer. Those API microservices ([https://www.ibm.com/cloud/learn/api](https://www.ibm.com/cloud/learn/api)) are valuable only when tied together by the mesh. It all falls into a single container that “owns everything” and allows the app to work on a user’s phone. Service mesh is being deployed now by many companies. Others are starting to pilot it.

Matt noted the value of containers as they relate to cost. Before, microservices communicated across platforms and AWS would charge processing fees. But if you can keep everything inside the container, then you’re only paying the local processing fees, not the larger network processing fees. Costs are important as new technologies emerge. Matt is often worried about the sprawl of technology and associated rising costs. Glenn agreed that adoption happens quickly when cost is a driver. Technology that increases value and decreases cost will be popular.

Glenn explained next that containers also increase portability. Like APIs, containers – if well-developed – can be plugged into different parts of a business. You don’t have to go to a re-developer. They offer efficiency, consistency, app development. Containers are not the same as virtual machines. Virtual machines need their own hypervisor environment. Containers, by contrast, all share the same host OS and system kernel, which makes them lighter in size and can therefore ramp up more quickly. Glenn acknowledged that students won’t develop containers, but their employers will use them. Graduates may be asked to tie containers to a service mesh. Mid-sized and smaller companies might end up buying containers “in a box.”

Gregory noted that Collin College – at the direction of their advisory board – now offers a containers course in their cloud degree. Collin is using Kubernetes for the orchestration. These new cloud courses are being developed as OER through the state of Texas and will be available for others to use. It’s all open source. Glenn suggested using guest speakers to give students a real-world perspective on how containers and service mesh are used. Larry said that he’s including containers in College of Southern Nevada’s advanced Linux and Azure classes. Glenn stated that students who have this knowledge will have an edge in the job market.

From the chat box: VMware IT Academy also has a Kubernetes course.

Matt explained that when he hires new staff, he tells them one goal is to “automate themselves out of their current job.” They’re wasting hours if they’re performing a redundant task that could be automated. This ongoing push towards automation is an industry-wide trend.
| AI networking  
| Glenn Wintrich | Glenn briefly discussed AI networking. AI predicts user experiences, adjusts bandwidths, self-corrects for maximum uptime, identifies root causes, deploys virtual assistances. The biggest real-world benefit, Glenn said, is helping to more quickly troubleshoot persistent problems that can take human IT staff members a long time to identify. It’s just too much detailed data to sift through. Likewise, AI can help reduce trouble tickets before the customer or the organization even recognizes that there’s a problem. Matt referenced Caterpillar and the way the company collects real-time data from the machinery to make adjustments and extend the equipment’s life and performance. |
| Data analytics and AI trends  
| Aaron Burciaga | Aaron offered a number of news items related to data analytics:  
  Aaron explained that these kinds of business decisions show the need for new skills.  
He uses the metaphor of a “big book of AI” – don’t teach students to fill a job. Instead, teach them the disciplines and how solutions support business applications. AI is coming to all kinds of management systems, not just networking. Work with your local BILTs to connect with local call centers, cybersecurity firms, and similar companies to develop programs to support the positions they need so colleges can feed that talent pipeline. Beyond the hype, Aaron urges educators to focus on the technical solutions that can be mapped to the business applications.  
  
Aaron’s “Big Book of AI”  
**CHAPTERS – technical solution areas**  
* Automation  
* Computer Vision  
* Data Blending  
* Data Engineering  
* Data Labelling  
* Data Operations  
* Data Visualization  
* Decision Science  
* Geoint  
* Human Factors  
* IoT  
* Machine Learning  
* NLP/NLG  
* Optimization  
* Simulation  
* Synthetic Data  
* UI/UX |
Ann asked for more specifics on adding the “A” for arts into STEM to make STEAM. Some see the “A” as soft skills, but Matt sees it as more traditional artistic skills. He stated that sometimes people in the arts do better at troubleshooting and problem-solving because they think outside the box. That can be a hard skill to teach. Matt suggested a social media-style student project to simplify a message into a 15- to 60-second video. That sort of communication skill is important. Some of Matt’s employees don’t get certain projects because they cannot effectively or creatively communicate.

From the chat box: At North Central Texas College part of our QEP (Quality Enhancement Plan) has us adding ethical decision-making, employability skills, networking problem solving employability skills, networking teamwork/collaboration, networking professional communication at three different levels. This is not only in networking but also for all of our CITE programs.

Aaron mentioned a cross-discipline approach to AI at one college that’s asking faculty to embrace AI. One English instructor, for example, will use AI to analyze the text from Harry Potter novels to better understand the author’s choices. He thinks all students – even liberal arts students – should learn how to do these kinds of analyses. The left brain and the right brain need to be “thinking together.”

Aaron, from the chat box:

\[\begin{align*}
\text{LEFT BRAIN} & | AX \\
& \text{Logic, science, math} \\
+ & \\
\text{RIGHT BRAIN} & | CX \\
& \text{Creativity, art} \\
+ & \\
\text{BRAIN STEM} & | IX \\
& \text{Information flow}
\end{align*}\]

Glenn agreed and mentioned college students in Ireland that worked on solving a technical problem for a CIO who needed to manage his thousands of daily emails. Of the six PhD
students working on the problem, only two had an IT background. The solution was more about changing the business culture rather than devising a technical answer. Glenn noted that a “mixed team” created better results.

Ervin explained that Collin College is developing a cyber-psychology course that will develop emotional and cultural intelligence, looking at how technology impacts people and cultures. He said there are a number of good books on this emerging topic. How do we implement technology so that it doesn’t offset the human factor?

Ann briefly mentioned the AI element to the ITSS project grant, which she’ll cover in more detail later. The ITSS thought leaders decided to treat AI as a “skill set” that can be layered across many disciplines and industries.

CTC Update Winter Working Connections (Mark Dempsey)

Winter Working Connections 2021 - Four tracks but three difference date formats
Dec 13-15
- Intro to Alteryx Designer and SparkED
- Intro to Bitcoins, Blockchains, Ethereum, and Smart Contracts
Dec 13-16 plus Jan 21 (five days)
- Microsoft Azure Administrator
Dec 3, 10, 17 and Jan 7, 14 (five Fridays)
- AWS Cloud Architecting

Bitcoin and Azure are both closed with waitlists. Matt asked about opening up more seats – Ann explained that the instructors have asked to keep the numbers down to ensure appropriate 1:1 interaction.

Special projects (Mark Dempsey)

Hybrid cloud project
- The reason we are offering these advanced AWS and Azure tracks at Winter Working Connections is because those are foundational tracks for a hybrid cloud track at Summer Working Connections 2022.
- The BILT previously asked the CTC to develop a way to teach student hybrid cloud skills – the CTC is working with faculty at College of Southern Nevada and Sinclair Community College to develop a project.
- A small BILT Tiger Team met on October 7 to review the project to date and offer feedback.
- Right now, the content is being informally piloted – a larger, more formal pilot will happen Spring 2022 at College of Southern Nevada and Sinclair Community College.
- This all leads up to the July 2022 track at Summer Working Connections.
- Ann noted that colleges are only now starting to offer cloud programs and certificates that can support this hybrid cloud project.

5G curriculum
- Three educators are developing some presentations and labs to explain 5G concepts, especially in how 4G differs from 5G.
- Two big events coming up:
  - Hosting a “test drive” presentation Nov 17 for a handful of educators
  - Lunch presentation at Winter Working Connections (Dec 13-15)
- Deliverables ready by Spring 2022
  - Prerecorded presentations
  - Virtual labs
  - Student exercises
  - Teacher’s guide
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<tr>
<th>Portfolios project</th>
<th>The ITSS project grant originally focused on specific IT job clusters that were in critical demand – IT skill standards across the board had not been identified since 2003.</th>
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<tbody>
<tr>
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<td>Six clusters are complete and all are posted to the ITSS website (<a href="https://connectedtech.org/itss-2020/">https://connectedtech.org/itss-2020/</a>):</td>
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<tr>
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<td>- “Data Analytics”</td>
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<td>- “Data Management &amp; Engineering”</td>
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<td>- “Infrastructure”</td>
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<td>- “Project Management”</td>
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<td>- “Technical Support”</td>
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<td>- “Software Development”</td>
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<td>The first five clusters have been approved and adopted by the Texas State Skill Standards Board; the sixth cluster (“Software Development”) is on the agenda for approval in December. 250 employers collaborated to create this content.</td>
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<td>For each job cluster, the ITSS grant has identified the expected KSAs (knowledge, skills, abilities) and tasks for entry-level hires, key performance indicators (i.e. what is “good enough” for the tasks), student learning outcomes that can help educator more efficiently use the material, and employability skills which can differ depending on the cluster but covers items like communication and teamwork.</td>
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<td>The original plan was to develop additional job clusters beyond the first six, but the IT “thought leaders” wanted instead to develop “skill sets” that could be layered on top of other disciplines. NICE has a list of 52 cybersecurity job roles, so ITSS is instead working on a cyber skill set list. The cyber skill set list is almost complete. The goal is a set of skills that is “awareness plus a little more” – a bit more training than you might get from an HR training module. Ann noted that it’s been harder to work on the skill sets than the job clusters because you have to be careful not to add items that require pre-requisites.</td>
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<td>As of now, the tentative skill sets as identified by thought leaders include:</td>
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<td>- AI</td>
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<td>- Machine learning</td>
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<td>- Internet of things</td>
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<td>- AR and VR</td>
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<td>- Robotic automation</td>
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Ann mentioned the next user-training session “Using Skill Standards to Advance Your College IT Curriculum” coming up on November 12. Educators will learn how to use the job cluster SLOs to support their curriculum.

Aaron discussed the evolution of airport staff to illustrate how jobs will be automated. Within three years, he predicted that the process of boarding planes will be handled by an AI system or greatly aided by AI just as TSA checkpoints are more and more relying on machines to help with scanning. Health, insurance, and finance are but some of the industries that will implement more collaborative robots, or “cobots.” Students need to have a basic understanding of automation. Within five years those who understand and interact with AI programs and cobots will be a part of the future, while those who cannot may be left behind.

Aaron is working with Richard and the Bay Area Community College Consortium to help write some position descriptions that employers will soon need, rather than waiting for employers to figure it out. The BACCC is telling the employers what specs they need to hire. The industry is struggling and many cases they don’t yet know what they need. Aaron wondered if the CTC BILT can do the same. Ann liked the idea, but it would require a longer meeting. Richard can share the work they’ve been doing.

Richard explained it’s a challenge getting the 28 colleges in the Bay Area to work together, but the industry is finding advantages. Employers would, of course, prefer the colleges all work together and standardize the effort. Ann noted that the BACCC will survive after the CTC ends.

Questions from the CCN

Mark asked the BILT about lean and agile. Are those skills important? Glenn replied that it’s related to scope. It’s less critical for a company of 50 people, but more so for a larger company where they may want new employers to have some knowledge when they start. Glenn noted that its important for students to have an idea of where they want to work. Do they want a job at a large global company or stay in a smaller city at a smaller company? Deciding that will help students pick which skills to develop.

Ann asked how do we cover all of these topics, including now these new suggestions of adding art to STEM to make STEAM, in just a 60-hour program. Glenn suggested a flexible “special topics” course might help. Matt suggested a social media sort of module to help boost artistic thinking, such as asking students to explain containers in a 30-second TikTok video. Tap into whatever the students are already doing. Find out which students are creative. Matt said that even those students who aren’t creative are often good at emulating what they like to see. Aaron mentioned a program at Miami Dade College that’s required all faculty to attend a five-hour AI workshop that pushes them to find new ways to embed AI. That’s where the previously mentioned Harry Potter text idea originated. Aaron urges faculty to challenge themselves.

Gordon talked about a team-based, 12-step design program he was involved with teaching electrical engineering. This program got students engaged and working together. They gave frequent presentations, met outside of class, and focused on a single theme with their project. He thinks this concept can be applied to any class. Ann wondered about offering something similar to IBM design thinking at a Summer Working Connections event. The key is for students to know their own value proposition – what do you bring to the table and how do you communicate that?

Gordon’s two PowerPoints can be accessed here.
| New national center | Ann explained that the proposal for the new national IT center in the NSF Advanced Technological Education program – which will replace the CTC when it sunsets – was submitted October 12. The CTC will have enough money for at least one “no-cost” extension year and so will continue past the original end date of June 30, 2022.

Ann helped Columbus State Community College create the new IT center proposal. She’s excited that so many on the CTC BILT expressed interest in continuing with the new IT center should it get funded. Ann will be an advisor. Mark and the CTC staff will continue on a subaward basis to help manage the BILT, the CCN educator community of practice, and the Working Connections training. Those three elements of the CTC grant were deemed essential.

Ann reminded everyone the proposal still has to be reviewed and approved. There is no guarantee of funding, but Ann is optimistic. The proposal seemed “solid.” |

**Next Meeting: Tuesday February 8, 2022 (8:30am-10:00am Central)**