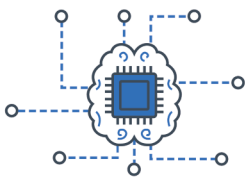


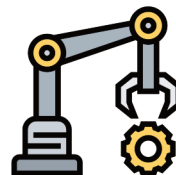
## Artificial Intelligence in Architecture, Engineering, and Construction By Christopher Baze, Hawaiian Dredging Construction Company



Machine Learning



Neural Networks



Robotics



Expert Systems



Fuzzy Logic



Natural Language  
Processing

There are many applications of Artificial Intelligence (AI) that are improving productivity in the Architecture, Engineering, and Construction (AEC) industry. This article will outline the capabilities of AI, current and potential uses, and the human aspect of interfacing with AI.

Artificial intelligence may be broken up into several branches, each of which are currently being used in the AEC industry in varying capacities. Machine Learning refers to the ability of a computer to learn from existing data and predict outcomes on its own. We work with a wide variety of building codes, zoning codes, standards, and regulations that are often conflicting and not easily understood by computers. Machine learning is being utilized to better understand and organize this data by first compiling it into one place. Automated building code compliance checking has been researched by several companies and has started to ease the burden of manual verification for compliance [1]. Similarly, zoning codes are being digitized and when a computer is able to understand the variables that our buildings must abide by, GIS software can be used to visualize the impact of potential zoning changes to an entire city. This technology has already been used by the City & County of Honolulu to study affordable housing options in the Mo'ili'ili neighborhood [2]. Beyond codes and standards, Machine Learning enables better

use of generative design in which parameters, rules, and goals are set for a design problem. Generative design generates hundreds or thousands of potential design solutions and machine learning can help categorize, optimize, and help a human select the best solution available [3]. After design is complete and construction begins, machine learning can help to understand the contract documents by organizing plans and specifications and extracting them into various logs that traditionally could take weeks of a project engineer's time. Computer Vision allows computers to understand digital images and video and recognize objects, events, locations in space, and other information that is typically must be inferred by a human. 360 cameras and drones can be used to capture images of a large jobsite or existing infrastructure very quickly, and computer vision can assist with tracking progress, detecting deviations, or creating 3D models with only the images as input. By adding additional sensors such as GPS, structured infrared light, or lidar, a sense of scale can be added for accurate takeoffs and measurements. Autonomous Robotics can further automate capturing reality or completing an expanding list of tasks in construction. Autonomous robots are on the market for construction layout, tying rebar, laying brick, coring holes in concrete, and finishing drywall. They are already on-island providing security

at the Bank of Hawaii [4] and are being developed at the University of Hawaii for deliveries [5]. Natural Language Processing does for text and speech what computer vision does for images and video, and also allows the computer to communicate back to the human. The most common use of this technology is through search engines and virtual assistants such as Siri, Alexa, and Google Assistant. More recent uses are allowing non-developers a way to query databases and create code by asking questions or describing desired functionality. Robotic Process Automation is business process automation that uses AI to observe and duplicate tasks that may involve several steps or pieces of software. This can reduce repetitive tasks and free up employees for more productive (and less mundane) work.

Artificial Intelligence relies on data to make data-driven decisions. Humans similarly rely on experience and available information to make decisions, but several cognitive biases often remove our objectivity. Optimism Bias is the belief that something negative is less likely to happen to you than others. Status Quo Bias is the tendency to proceed with a prior made decision instead of changing course. Sunk Cost Fallacy describes our desire to follow through on efforts we have already invested resources into, and Confirmation Bias is our tendency to use data to support our existing beliefs and assumptions [6]. Conversely, the output from AI can have its own biases and needs to be viewed through the subjective lens of a decision maker.

Artificial Intelligence can improve decision making and business processes, but requires good data to do so. To take advantage of current and future commercially available AI tools, it is important to think about your company's data and how it is input, processed, and stored. For design and construction firms, cloud-based Common Data Environments are becoming prevalent as a consolidated location to store project information [7]. This single hub of data for a project can reduce the time needed to locate information, add better structure to the data you have, and facilitate better communication and collaboration. The Internet of Things concept of embedding connected sensors, processors, and/or software into hardware assets to better understand and collect data from can be an excellent way to passively collect additional data for AI efforts.



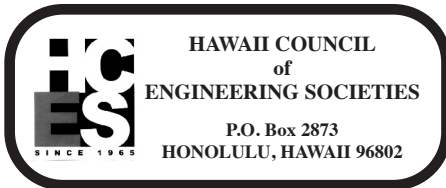
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**WILIKI MAILING LIST**

Additions and/or corrections to the Wiliki mailing list should indicate the proper society, institution or association. Corrections to email addresses should be submitted to your society coordinator.



HOME PAGE: [hceshawaii.org](http://hceshawaii.org)  
EMAIL: [hcesorg@gmail.com](mailto:hcesorg@gmail.com)

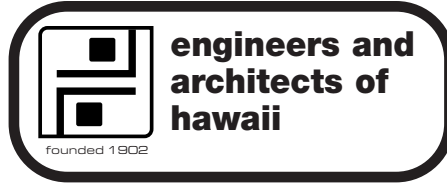
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President:	Jon Baker <a href="mailto:jbaker@honolulu.gov">jbaker@honolulu.gov</a>
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Nat. Delegate:	Kyle Yukumoto <a href="mailto:kyley@rmtowill.com">kyley@rmtowill.com</a>



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**An association for Hawaii's Engineers and Architects**

**WEB address:** [www.eahawaii.org](http://www.eahawaii.org)

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Director	George Coates	234-5659
Director	Howard Wiig	587-3811
Director	Joe Feind	
Director	Dave Martin	543-4504

**Friday Meeting Dec 3rd, 2021**

Speaker: Bill Brizee, Principal Architect ahl – Past eaH President

Topic: Queens Theater Renovation Plans

Bill will tell us about the Hawaiian Music Hall of Fame' plans to renovate the Queen Theater on Waiālae Ave in Kaimuki into a performing Theater, Museum and recording studio. It will be a new venue dedicated to Hawaiian performance of art and music. It will also include a TimeLine, a Wall of Honorees, displays for music and art artifacts.

**Friday Meeting Dec 17th, 2021 TBA**  
**From: President Philip Blackman**

The Following is the Position Statement prepared by the eaH Board and Members for support of "Historic Ha'iku Stairs Managed Access".

**Position Statement: "Ha'iku Stairs – Managed Access"**

o The engineers and architects of Hawaii (eaH) is in support of Preserving the Historic Ha'iku Stairs for Honolulu's citizens under a Managed Access plan as recommended in the Board of Water

o Supply prepared Final Environmental Impact Statement. eaH believes Managed Access provides the best long-term solution for the City to reduce its liability and meet its responsibilities for Ha'iku Ridge and Ha'iku Stairs and its civic duties to provide safe hiking access for Honolulu citizens and tourists.

o Therefore, eaH asks the City to initiate preparation and release of a Request for Proposals (RFP) from qualified organizations for a Managed Access Plan for Ha'iku Stairs.

o eaH advises the City hold in abeyance any action or expenditure of funds for planning or removal of the existing Ha'iku Stairs, until the feasibility of Managed Access is fairly assessed via a RFP evaluation process.

Managed Access can encompass the following:

- All Access to and from the trailhead provided only by official shuttle vehicles loaded and unloaded away from Ha'iku neighborhoods;
- Shuttle vehicle access to the trailhead via the old Ha'iku Road or other access that avoids Ha'iku neighborhoods;
- 24/7 Security to prevent trespass through neighborhoods to reach the Ha'iku Stairs and Ha'iku Ridge;
- A limitation on numbers of hikers per day;
- Hiker groups escorted by official trained guides, who can provide briefings on Ha'iku Stairs History, native and invasive plants, and

hiker safety;

- Hiker guides shall have secure communication with the operations office and emergency services;
  - Hikers Fees are to be set to cover costs and profits such that no funds are required from the City. Costs can include but not be limited to operations and maintenance, liability insurance, transport, rescue, security, annual structural inspections of the Stairs by qualified structural engineer, and a reserve fund.
- End of Statement

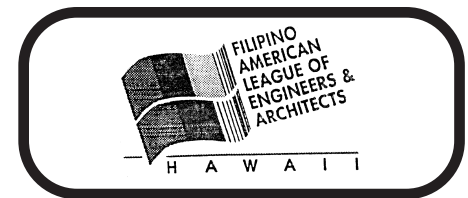


<http://www.hawaii.spe.org/>

**HSPE Officers for 2020-2021**

Acting Pres:	Sara Doi <a href="mailto:sdoi@bowersandkubota.com">sdoi@bowersandkubota.com</a>
Pres. Elect:	Irina Constantinescu <a href="mailto:IConstantinescu@BrwnCald.com">IConstantinescu@BrwnCald.com</a>
Vice Pres:	vacant
Past Pres:	Sara Doi <a href="mailto:sdoi@bowersandkubota.com">sdoi@bowersandkubota.com</a>
Secretary:	Majella Stevenson <a href="mailto:MujTravel@aol.com">MujTravel@aol.com</a>
Treasurer:	Kurt Kunimune <a href="mailto:kkunimune@bowersandkubota.com">kkunimune@bowersandkubota.com</a>
HOD '19-'21:	Mike Silva <a href="mailto:mike@femaui.com">mike@femaui.com</a>
Big Island Dir., NICET Chair '19-'20:	Curtis Beck <a href="mailto:curtbegood@mail.com">curtbegood@mail.com</a>

Nominations for the **Engineer of the Year** and **Young Engineer of the Year** candidates will be accepted the beginning of November 2021. Nomination forms will be available on the HCES website at <http://hceshawaii.org/> or by contacting Kurt Kunimune of HSPE at [kkunimune@bowersandkubota.com](mailto:kkunimune@bowersandkubota.com). The awardee will be presented at the Engineer's Week Banquet in February of 2022. Please contact Kurt Kunimune or HCES for nomination forms or with any questions. Please submit nominations to Kurt Kunimune by Monday, December 27, 2021. Mahalo.



P.O. Box 4135, Honolulu, Hawaii 96812  
Website: <http://www.falea.org>

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Treasurer:	Joel L. Francisco
Public Rel. Off:	Maricel O. Guinto
Immediate Past President :	Gene C. Albano, Jr.
Directors:	Angelie L. Armas Riza Marie Gatdula/Cao Maritez A. Marquez Joey G. Resurreccion Elvi M. Sutherland Roger A. Urbi



#### 2020-2021 ASCE Hawaii Section Officers

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email: [dnemoto@ascehawaii.org](mailto:dnemoto@ascehawaii.org)

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email: [clum@ascehawaii.org](mailto:clum@ascehawaii.org)

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email: [etomishima@ascehawaii.org](mailto:etomishima@ascehawaii.org)

Secretary: Sheila Uyeoka, P.E.  
email: [suyeoka@ascehawaii.org](mailto:suyeoka@ascehawaii.org)

Past Pres.: Jason Kage, P.E.  
email: [jkage@ascehawaii.org](mailto:jkage@ascehawaii.org)

YMF Pres.: Carly Kaneko, P.E.  
email: [ckaneko@ascehawaiiyymf.org](mailto:ckaneko@ascehawaiiyymf.org)

#### EXECUTIVE COMMITTEE MEETING

Last held: November 10, 2021

Next meeting: December 8, 2021

#### ASCE HAWAII SECTION DINNER MEETINGS

The continued health and safety of our membership is our top priority and we will continue to monitor the COVID-19 pandemic. Future in-person ASCE Hawaii Section events, including our section dinner meetings, are still temporarily on hold. Zoom meetings will be scheduled in lieu of in-person meetings, date and time TBD. We will keep you informed via e-blasts and/or notices posted on our website at [ascehawaii.org](http://ascehawaii.org) when they will be scheduled. Please continue to stay safe, watch out for each other, especially our kupuna, and continue to be vigilant about best health practices.

**DECEMBER MEETING** – Watch for an e-blast with information and a link to register for our next meeting.

Cost: None (RSVP via Eventbrite)

#### ASCE's COVID-19 RESOURCES PAGE

<https://collaborate.asce.org/covid-19/home>

Reminder that ASCE has launched a COVID-19 resources page with online tools and tips in one convenient place. The page includes links to free programs, training, and resources, the results of COVID-19 industry impact surveys, and relevant online discussions with fellow members. The page also offers several ways to work more effectively while at home and activities to take advantage of in the down time you may have – even fun things to do with the keiki! And don't forget that all members have 10 free PDHs! Now may be a good time to catch up on some of those technical on-demand webinars.

#### COMMITTEE POSITIONS

ASCE Hawaii is looking for volunteers for various committee positions, including History and Heritage Chairperson, Advocacy Captain, Report Card Committee Members, and Water Resources Chairperson. If you are interested or have questions on any of these positions, please contact President Dayna Nemoto-Shima, [dnemoto@ascehawaii.org](mailto:dnemoto@ascehawaii.org).

#### MEMBERSHIP

If you haven't already done so, please renew your ASCE membership, which includes 10 free PDHs. You can renew your membership at [www.asce.org](http://www.asce.org).

#### ASCE HAWAII SECTION STUDENT SCHOLARSHIPS

Please help us increase our scholarship endowment so that we can recognize deserving students. We continue to accept tax-deductible donations with the goal of increasing the annual scholarships. Make your check payable to 'ASCE Hawaii Section' and include the note 'Walter Lum Scholarship Fund' and mail to: ASCE Hawaii Section, P.O. Box 917, Honolulu, HI 96808-0917. If you have any questions, please contact Eric Tomishima at [etomishima@ascehawaii.org](mailto:etomishima@ascehawaii.org).

#### ASCE GOLF TOURNAMENT

Save the date for next year's tournament, currently planned to be on Friday, Aug 5, 2022.

#### ASCE JOB LISTINGS

The following job listings are currently posted on the ASCE Hawaii Section website:

- **AECOM** (Civil Engineers II)
- **City and County of Honolulu** (Civil Engineer III, IV, V, Civil Engineer V (Geotechnical), & Electrical Engineer V)
- **Gray Hong Nojima & Associates, Inc.** (Junior Civil Engineer)



#### 2021-2022 YMF Officers

Claire Fukuoka, President  
[president.ascehawaiiyymf@gmail.com](mailto:president.ascehawaiiyymf@gmail.com)

Brandon Uejo, Vice President  
[vicepresident.ascehawaiiyymf@gmail.com](mailto:vicepresident.ascehawaiiyymf@gmail.com)

Lance Lam, Treasurer  
[treasurer.ascehawaiiyymf@gmail.com](mailto:treasurer.ascehawaiiyymf@gmail.com)

Rebecca Pitts, Secretary  
[secretary.ascehawaiiyymf@gmail.com](mailto:secretary.ascehawaiiyymf@gmail.com)

Carly Kaneko, Past President  
[pastpresident.ascehawaiiyymf@gmail.com](mailto:pastpresident.ascehawaiiyymf@gmail.com)

#### YMF Contact List Update

The Hawaii YMF has recently updated the contact list with new email addresses for all YMF officers and committee chairs! Please visit our website at <https://ascehawaiiyymf.org/> for a complete listing of all updated email addresses.

- **G70** (Civil Designer, Civil Engineer, Civil Project Manager, Construction Manager)
  - **HDR** (Senior Civil Engineer, Project Manager, Senior Engineering Project Manager, Water/Wastewater Engineer)
  - **Hawaii Housing Finance and Development Corporation** (Section Chief)
  - **Kennedy/Jenks Consultants** (Project Manager, Honolulu Staff Engineer, Hawaii Staff Engineer)
  - **Nagamine Okawa Engineers Inc.** (Structural Engineer)
  - **R.M Towill Corporation** (Assistant Engineer I, Assistant Engineer II, Civil Design Engineer, Design Visualizer 3D Modeler)
  - **SSFM** (Civil Engineer V, Structural Engineer IV)
  - **Stantec** (Account Manager/Engineer-Water)
- For further information, please visit <http://www.ascehawaii.org/job-listings.html>.

#### 2022 PE Exam Update

The PE Exam will be computer-based with appointments available year-round at Pearson VUE test centers beginning April 1, 2022. Registration for the 2022 test sessions is open as of November 1, 2021.

Information about how to register for the exam and purchase study materials can be found on the YMF website: <https://ascehawaiiyymf.org/pe-exam-information>

#### Online PE Refresher Course

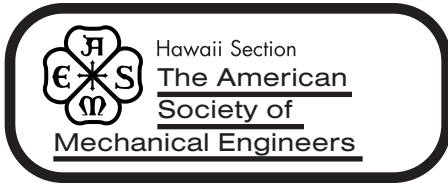
The Hawaii YMF has partnered with Pathceed, an online PE Exam refresher course that covers the breadth portion of the civil engineering exam. This course features 12-hours of on-demand course materials that may be accessed for a 6-month period, and a one-time free access should you not pass the exam. Curious but want a sample of the course? There's a free 1-hour lesson you can check-out before committing to the program!

Cost of the course is \$289 and we are offering ASCE Hawaii YMF members a \$40 discount when registering. If interested in signing up for this course, please contact Nicole at [yymf808.pecourse@gmail.com](mailto:yymf808.pecourse@gmail.com) for more information.

## WILIKI ADVERTISERS NEEDED

5" x 2" – (10□) \$64.00	2 <sup>5</sup> / <sub>16</sub> " x 2 <sup>1</sup> / <sub>2</sub> " (6□) \$40.00	7 <sup>1</sup> / <sub>2</sub> " x 5" – (37 <sup>1</sup> / <sub>2</sub> □) ½ page – \$240.00
7 <sup>1</sup> / <sub>2</sub> " x 3 <sup>5</sup> / <sub>16</sub> " – (25□) (½ page) – \$160.00	4 <sup>7</sup> / <sub>8</sub> " x 2 <sup>5</sup> / <sub>16</sub> " (11□) \$72.00	
	2 <sup>5</sup> / <sub>16</sub> " x 1 <sup>1</sup> / <sub>4</sub> " \$20.00	

The price for the ads will be based on a 1<sup>1</sup>/<sub>4</sub>" x 2<sup>5</sup>/<sub>16</sub>" module size which is 1/24th of the page, and be \$20.00 per month with a 15% DISCOUNT for a 6-MONTH RUN.



[www.asme-hi.com](http://www.asme-hi.com)

**ASME-HI 2021-2022 Officers**

Chairperson Derek Sato  
*derek.sato@hawaiianelectric.com*  
 Vice-Chair Abel Siu Ho  
 Secretary Raymond Liu  
 Treasurer Kevin Dang  
*dangk001@hawaii.rr.com*  
 Member-@-Large Shaun Idefonso  
 Ed Chang

**ASME-HAWAII GENERAL MEMBERSHIP MEETING**

Date: December 3, 2021  
 Agenda: Prep for Fall Francis R. Montgomery Design Competition

As usual, all members, students and guests are invited and encouraged to attend our Zoom Conference Call meetings. Please contact Derek Sato for the link.

**EXECUTIVE COMMITTEE MEETING  
 October 29, 2021**

Our September Zoom Virtual meeting was held September 24, 2021 starting 5:30 PM (HST). Meeting was conducted by Chairperson Derek Sato with the following discussed:

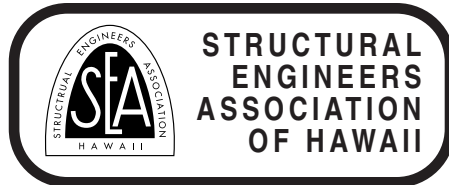
- The Fall Francis R. Montgomery Design Competition award tiers approved. The Fall Francis R. Montgomery Design Competition is scheduled for December 10, 2021. Four teams will be competing. ASME judges are needed.
- FE Exam Prep Course: Plans for an ASME-HI, FALFA and UHM COE FE Exam Prep Course is being planned. The FE exam is a computer-based exam administered year-round at NCEES-approved Pearson VUE test centers. Course will be opened to UHM students and for engineers needing a refresher. Duration of prep course is normally 12-weeks with study topics based on the NCEES Exam Prep materials. With the anticipated ease in COVID gathering restrictions, the committee is looking into in-person meetings, with local engineering professionals helping to facilitate the course. If you would like to participate as a facilitator, please contact Raymond Liu at 808-497-1395. Stay tuned for updates.

**MATHCOUNTS 2022**

For those following MATHCOUNTS: As reported by Nhut Pham, HSPE Hawaii MATHCOUNTS State Coordinator, the 2022 Chapter Competition will again be held online through AoPS platform on February 17, 2022. At the moment due to Hawaii COVID-19 relaxing guidelines, the State Competition in March may be in-person. A final decision is coming.

The National Competition is expected to be held in-person in Washington, DC, May 7-9, 2022.

**Deadline for  
*Wiliki*  
 is December 15th**



PO BOX 3348, HONOLULU, HI 96801  
 Web Page URL <http://www.seaoh.org>

**2021 BOARD OF DIRECTORS  
 OFFICERS AND DIRECTORS**

President John Uno  
*john@mkellc.com*  
 Vice President Craig Meierhoffer  
*cmeierhoffer@baseengr.com*  
 Clifford Lau  
*clau1@honolulu.gov*  
 Secretary James Aoki  
*james.m.aoki@usace.army.mil*  
 Treasurer

**Upcoming Events**

For all events see [seaoh.org](http://seaoh.org) or email flyers.

**SEAOH Annual Scholarship Golf Tournament**

The Annual Scholarship Golf Tournament will be postponed to February 11, 2022. Updates will be provided to the membership via email.

**Education Committee**

We are currently looking for an individual to serve as Education Committee Chair. If interested, please contact a current board member for more information.

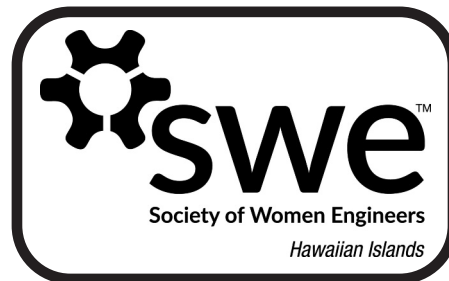
**2022 Board of Directors Nominations**

We are currently accepting nominations for Director and Secretary for the 2022 Board of Directors. If interested, please contact a current board member for more information.

**Membership Applications**

Application was received from Clayton Hayes for Member. Please contact any SEAHO Board Member by January 1, 2022 to file comments regarding the applicant.

**Next Meeting** on Wednesday, December 1, 2021. For information, contact SEAHO President John Uno at [john@mkellc.com](mailto:john@mkellc.com)



HOME PAGE: <http://hi.swe.org>  
 EMAIL: [swe.hisection@gmail.com](mailto:swe.hisection@gmail.com)  
 Facebook: [www.facebook.com/swe.hawaiianislands](http://www.facebook.com/swe.hawaiianislands)

**2019-2020 SWE Hawaiian Islands (SWE-HI) Section Officers**

President: Dian Nguyen, [dungpnguyen@gmail.com](mailto:dungpnguyen@gmail.com)  
 Vice President: Andrea Mansfeld, [amansfeld@oceanit.com](mailto:amansfeld@oceanit.com)  
 Treasurer: Kristen Yoshida, [kristenhaau@gmail.com](mailto:kristenhaau@gmail.com)  
 Secretary: Chi Jow, [cjow.swehi@gmail.com](mailto:cjow.swehi@gmail.com)

The mission of the Society of Women Engineers is to empower women to achieve full potential in careers as engineers and leaders, expand the image of the engineering and technology as a positive force in improving the quality of life, and demonstrate the value of diversity and inclusion.



**2021-2022 Officers:**

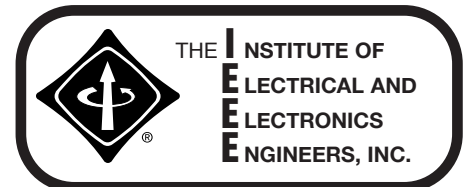
President: Jasmine Teramae-Kaehuaea  
*jkaehuaea@atahawaii.com*  
 Vice Pres.: Keoni Wasano  
*keoni@goldwings-supply.com*  
 Sec/Treas: Mike Motoki  
 C&C of Honolulu, DTS

November 8th was national STEM day and the section supported high school students through a pre-recorded technical tour about traffic signals. UH Student Chapter Vice President, Jonah Loric, hosts the tour and is joined by Phoenix Pacific Vice President, Danny Smoot. The video is available through the section website.

The 2022 ITE HI Section Officers were sworn in during the October annual meeting.

President: Jasmine Teramae-Kaehuaea  
 Austin Tsutsumi & Associates  
 Vice Pres.: Keoni Wasano  
 Goldwings Supply Service, Inc.  
 Sec-Treas: Mike Motoki  
 C&C of Honolulu, DTS

If you would like to be added to the ITE mailing list, please email Keoni Wasano at [keoni@goldwings-supply.com](mailto:keoni@goldwings-supply.com).



**IEEE Hawaii Section**

**Hawaii Section Officers: 2020-21**

Section Chair: Steven Minakami  
*smina002@fiu.edu*  
 Vice-Chair: Kishore Erukulapati  
*ekishore@ieee.org*  
 Treasurer: Wayne Layugan  
*wlayugan@hawaii.edu*  
 Secretary: Open



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 Vice Pres David Lebowitz  
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**Board of Governors**

Willie Diguc, PE, Kevin Luoma, PE, Paul Scott, Dan Mestas

**Artificial Intelligence, from Page 1**

Large software vendors have been competing to create Common data environments which allow their customers to take advantage of AI processing without needing in-house expertise. Autodesk, Trimble, Bentley, Procore, and Oracle all have CDEs with additional tools to ease workflows and add value. Apart from Oracle, these solutions are hosted on Amazon Web Services or Microsoft Azure [8]. The more data that these solutions consume and process from various customers, the more valuable they become. Pype SmartPlans by Autodesk, for example, compares uploaded drawings to millions of similar sets from other customers to look for important information to extract and discover potential omissions [9].

The list of applications of AI for our industry is rapidly evolving and expanding, and for non-programmers, a basic understanding of how the technology works can assist with determining how to best take advantage of it. If you are interested in learning more, recordings from recent AACE Hawaii Section webinars including "The Technology Chessboard" and "Automation in Architecture, Engineering and Construction" are available at aacehawaii.com.

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**About the author:** Christopher Baze has been working at Hawaiian Dredging Construction Company (HDCC) since 2009. He has served as HDCC's BIM Manager since 2011 and been actively using and managing software and hardware from companies including Autodesk, Trimble, and Leica Geosystems. He has been in Hawaii since 2007 when he graduated from Virginia Tech with a Bachelor of Architecture degree and currently serves as Vice President of the Hawaii Section of AACE International.



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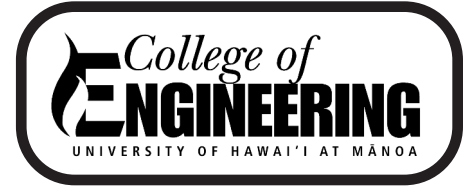
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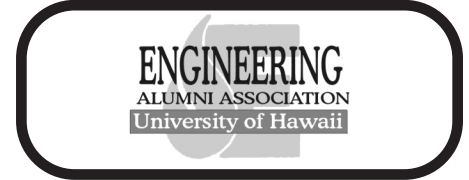
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