

# The Future of Building

**2021 ANNUAL REPORT** 

CONSTRUCTION INDUSTRY INSTITUTE

#### OUR VISION

Leveraging new ideas, unique forms of collaboration, and knowledge across the capital project and facility lifecycle, CII provides unmatched advocacy for the built environment.

CII envisions an efficient capital projects industry that **BUILDS PREDICTABLE VALUE** for member organizations, society and stakeholders.





### TO OUR MEMBERS Leading our Industry



#### **2021 INTERIM CHAIR**

#### DURING MY ROLE AS CII'S CHAIR IN 2021,

I had the distinct honor and privilege to work with a diverse team of dedicated and remarkably talented leaders. Together, we continued to execute on our strategic priorities and provided valuable outcomes to members, like the launch of CII's Data Warehouse and much-anticipated research on Capital Efficiency.

After more than two decades of volunteering in CII, I can honestly say the very best part of this experience is the team of incredibly passionate and exceptionally hard-working members collaborating to improve our industry. We accomplished a lot in 2021, and I thank you for the opportunity to help lead your Institute last year.

**DOUG OMICHINSKI** Bechtel Global Inc.



#### 2022 CII INCOMING CHAIR

**WE ARE STILL EXPERIENCING** unprecedented times, and I am inspired by CII's equally unprecedented commitment to responding to the needs of our industry. I will remember 2021 as a year of accomplishments, progress, and hard work across CII's member organizations.

In 2021, our leadership team laid the groundwork for CII's nine focus areas, covered in more detail on Page 4. CII's Executive Leadership Program continues to deliver professional training to executives leading high-performing teams. Due to an increase in demand for executive trainings, CII launched a next-level executive development course intended for industry leaders at the senior level, called TEN20°.

Last year, CII made great strides in the areas of professional development, data analytics and meaningful research. After 20 years of service to CII, it is my distinct pleasure to step into the role of 2022 CII Chair.

TODD SVIHOVEC Flint Hills, 2021 Vice Chair

# Doing the Right Projects Right

CII is continuing to shape the future of building through groundbreaking research. In 2021, teams from across the industry investigated the role of data and advanced technologies, the impact of workforce needs and workplace culture, and the power of collaboration to drive value. Teams delivered original insights and practical tools to help organizations determine which projects should be built in the first place—and how.

#### RT-372

SMART DATA-CENTRIC LIFE CYCLE APPROACH TO COLLABORATIVE EXECUTION OF CAPITAL PROJECTS



#### Driving Value: Data and the Power of Disciplined Collaboration

Every stakeholder on a capital project needs access to the same, accurate information. But without guidelines, using diverse software tools to manage and share data, and support project goals is difficult. This team identified barriers to data sharing at both the organizational and project levels and developed a framework with resources to help teams overcome those barriers and continuously improve. Their work reveals that a smart datacentric, collaborative approach can establish a tightly-knit supply chain and minimize the risk of transferring flawed information during the many handoffs when developing, executing, turning over, operating, and maintaining capital projects.

#### RT-DCC-07

CAPITAL EFFICIENCY SCORECARD FOR DOWNSTREAM AND CHEMICALS PROJECTS



#### Score Your Capital Efficiency

When business and project teams are aligned, the efficiency of capital projects improves. This isn't easy in a competitive environment plagued by low rates of return and high cost overruns. Using an economic analysis of different projects, this team created a **Capital Project Efficiency Scorecard** to help organizations pick the right capital projects. The team identified 28 pivotal management processes to assess strengths, address gaps and help business and project teams better coordinate across capital management and project deployment.

#### RT-DCC-06

UPDATING PROJECT DELIVERY AND CONTRACT STRATEGIES



#### Delivering Performance

Project Delivery Systems (PDS) have come a long way in the last decade. This research team dug into the four major delivery systems and multiple subsystems to quantitatively evaluate the benefits and limitations of each. The team collected and analyzed 96 projects, calculating a **Project Performance Score** that allowed it to compare disparate projects. As a result, the team created a decision support tool that presents predictive scores to **help organizations choose the delivery system** best suited to drive the performance of their project.

#### FIND US ONLINE

FOR THE FULL RESEARCH, enter the report number at www.construction-institute.org/ resources/knowledgebase.

**TO GET INVOLVED** in CII research, contact kldelaney@cii.utexas.edu.

#### RT-373

MCPI — THE BUSINESS CASE FOR MODULAR CHEMICAL PROCESS INTENSIFICATION



#### Build the Plant You Need for Less

What if you could dramatically reduce the cost, footprint and time it takes to build your plant while gaining a faster payback? It's possible, based on the findings of the joint CII and RAPID Institute research team that **explored capital efficiency for modular chemical process intensification**. The team identified how using different technologies to build the plant you need can drive energy efficiencies, increase safety and lead to much greater capital efficiency.

87% REDUCTION IN CAPITAL EXPENSE ACHIEVED IN AN MCPI CASE STUDY

#### **WORKFORCE 2030**

#### RT-370

MODELING THE COMPOSITION OF THE 2030 WORKFORCE



#### Shape Your Future Workforce

What will your workforce look like in 2030? Based on current trends, it will include untapped technology at the jobsite with more multi-skilled, less mobile and older craft professionals. These are among the findings of the team examining issues across Technology, Workforce Skills, and Workforce Culture. Drawing on more than 1 million data points, the team tackled tough topics to explore the causes and motivations driving today's craft professionals. They also studied what it will take to attract and retain the next generation of workers, challenging leaders to "shape the future you need" to keep the industry healthy.

#### RT-371

ONSITE VS. OFFSITE — THE IMPACT OF OFFSITE CONSTRUCTION ON THE WORKFORCE



#### Get Ready for 2030 with Offsite Construction

As offsite construction continues to grow, companies can take advantage of this shift by preparing their workforce now. This team developed a maturity model and scoring system to help companies assess, benchmark and track their progress; a recommended list of technologies; and ideas for planning, managing and training their workforce. The team also created a framework for organizational improvements and a proactive, forward-thinking roadmap to evaluate progress as companies move to, and leverage, offsite construction.

NEARLY 41% OF THE CONSTRUCTION WORKFORCE WILL RETIRE BY 2030

#### WHAT'S NEXT

# Evolving to Thrive in a Changing World

CII is continuing to shape the future of building through relevant research that helps drive an efficient capital projects industry. In 2021, CII defined *nine research focus areas* to meet the demands of our rapidly changing world.

These areas build on decades of research to create a diverse portfolio of tactical projects that can be implemented quickly and strategic projects that set a desired state and a path to achieve it. Teams can engage more kinds of expertise and balance speed with quality to innovate, collaborate and deliver original insights and practical tools that can be accessed easily and continuously improved.

#### CII FOCUS AREAS

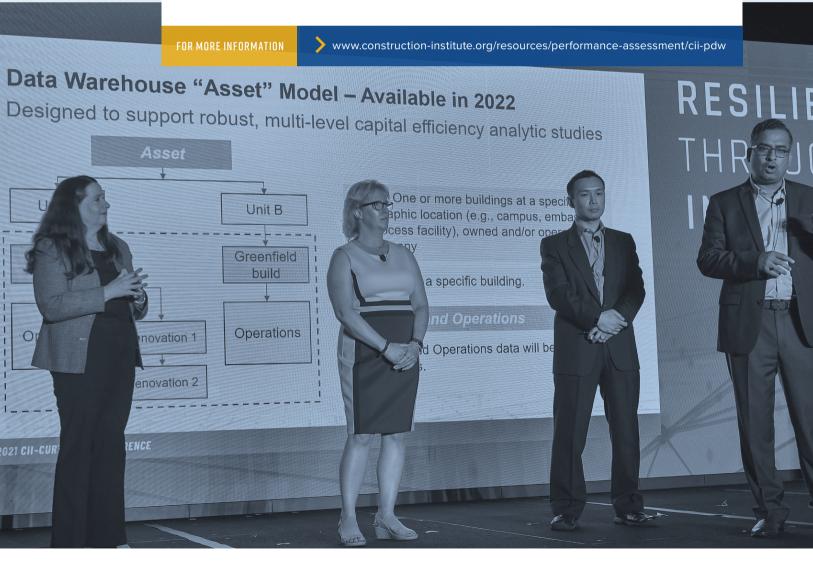
Pursuing	Leading Advanced	Tool and Practice Selection –		
Capital Efficiency	Work Packaging (AWP)	Deployment Concierge		
Further expand beyond predictability to ultimately address the efficacy of capital projects	Maintain CII's thought leadership as new AWP ideas and applications continuously emerge	Create tools to help CII members better use its valuable research, educational resources and services required to implement practices effectively while setting the foundation for integrating tools and a vision for digitally delivering CII practices		
Implications	The Workforce	Integrated , Collaborative Delivery		
of ESG Drivers	of 2030	for Better Business Results		
Understand how environmental, social, and governance (ESG) criteria may affect the type, selection and execution of future projects	Define an ideal state for the workforce of the future and how to achieve it, helping companies address issues today while preparing companies for the future's workforce	Define the means to promote more effective delivery leveraging integration, collaboration and new business models		
Thriving in a	Cultivating	Digital		
Circular Economy	Change	Transformation		
Provide actionable strategies and tools for increased sustainability in the delivery of capital projects and resulting assets	Define how capital project organizations can become more agile when facing an increased rate of change, especially when driven by a global pandemic, decarbonization and regulation	Provide guidance to capital project organizations on how to envision, define and progress on their path to digital transformation		

## Measuring Success in Real Time

CII's Data Warehouse has turned decades of performance assessments and best practices into a first-of-its-kind benchmarking and research platform. Launched in August 2021, the Data Warehouse combines 25 years of benchmarking expertise with advanced computational capabilities and data expertise from the Texas Advanced Computing Center (TACC).

Members can gain relevant comparisons and rich details on how well a project may perform on factors such as cost, scheduling, safety, resource use efficiency, and engineering and manufacturing productivity. The platform draws aggregated data from thousands of completed projects and makes it easy for members to add their own project data anonymously. Importantly, these data are never sold.

Within the Data Warehouse, Project Labs that group like projects together to generate deeper insights are already forming. Given the wealth of data being collected, efforts are under way to apply techniques, such as machine learning, for future predictability and real-time performance benchmarking.



#### SHARING EXPERTISE

# **Expanding CII's Impact**

Creative partnerships and smart alliances draw on deep CII expertise to provide innovative and flexible resources that build the management skills of both seasoned construction professionals and those new to the capital projects environment.

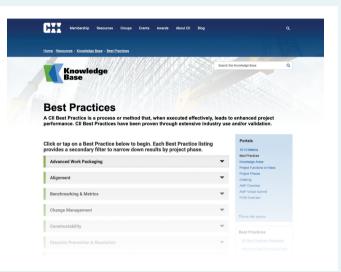
#### 2021 HIGHLIGHTS INCLUDE:

#### **CII Best Practices Courses**

This semester-long graduate-level course covering all 17 CII Best Practices was offered to 186 students at nine universities in 2021. The course addresses current issues and offers real-world, proven construction management practices that can be applied immediately. Each class is taught by industry subject matter experts from top CII member companies, sharing their knowledge and expertise with the next generation.

#### 2021 PARTICIPATING UNIVERSITIES:

Arizona State University Clemson University Florida International University Georgia Tech University of Houston Missouri S&T University of Nebraska-Lincoln University of Texas at Austin Vanderbilt University



40% INCREASE IN THE NUMBER OF PARTICIPATING STUDENTS OVER LAST YEAR

#### FIND US ONLINE CONSTRUCTION-INSTITUTE.ORG/resources/education

#### 2021 CII-CURT Joint Conference

Leading our Industry OUR WORLD-CLASS ANNUAL CONFERENCE brought more than 400 CII members together to share innovative ideas, learn, honor peers and network.





IN 2021, CII DELIVERED RESULTS FOR 6 RESEARCH PROJECTS AND KICKED OFF 10 NEW RESEARCH TEAMS.



#### **PMI Certification**

CII has teamed with the **Project Management Institute** to develop the **Construction Professional in Built Environment Projects (CPBEP)™ certification**. Through seven online, self-paced courses, this new learning solution builds on CII Best Practices to provide the skills and knowledge needed to bring large, complex construction projects to life profitably, efficiently, and sustainably.

#### CII Registered Education Providers (REP)

CII accepted 11 organizational REPs from around the globe in 2021. They provide CII member organizations and the general public with a **corps of professional instructors who are familiar with CII materials**, including its practices, research findings, Knowledge Base resources, publications, tools, and methodologies. CII REPs are available to hold educational offerings at CII member organizations and other venues, as well as virtually.

#### **CII Online Education (OLE)**

This year, CII added two new online courses to its online course catalog: Front End Planning and Introduction to Project Risk Assessment. These new courses increase the catalog to **10 stand-alone courses and four learning paths** for a total of 22.5 earnable Professional Development Hours (PDHs).





## Building *our* Future

As the premier research and development platform for the engineering and construction industry, CII and its members are driving innovative solutions that tangibly improve business outcomes to advance our industry and shape the future of building.

#### CONTRACTORS

Alfred Miller Contracting APTIM Baker Concrete Construction Inc. Barton Malow Company Bechtel Group, Inc. Black & Veatch Brown & Root Burns & McDonnell Chiyoda Corporation Clough USA CRB

#### OWNERS

AdvanSix Air Products Albemarle Corporation American Transmission Anheuser-Busch InBev Aramco Services Company Archer Daniels Midland Company Architect of the Capitol Ascend Performance Materials AstraZeneca **BHP** Billiton Cargill, Inc. Chevron CII ConocoPhillips

Day & Zimmermann Digital Construction Works Emerson Exyte U.S. Inc. Faithful+Gould Fluor Corporation H+M Industrial EPC Hargrove Engineers + Constructors Hatch Hexagon PPM Jacobs JGC Corporation KBR Kiewit Corporation Larsen & Toubro Limited MasTec Power Corporation Matrix Service Company McCarthy Building Companies, Inc. McDermott International, Inc. PCL Constructors, Inc. PLH Group POWER Engineers, Inc. Primus Builders Richard Industrial Group Samsung C&T Sennaat/NPCC SNC Lavalin Techint Engineering & Construction Technip Energies Technip FMC thyssenkrupp Industrial Solutions (USA), Inc. Toyo Engineering Corporation United Engineers &Constructors, Inc. Victaulic Wood Worley Zachry Group

Consolidated Edison Company of New York Covestro LLC DTE Energy DuPont Eastman Chemical Company Enteray ExxonMobil Corporation General Electric Company GlaxoSmithKline Global Infrastructure Partners Honeywell International Inc. INEOS Group Holdings S. A. Johnson & Johnson

Kaiser Permanente Koch Industries, Inc. Los Alamos National Laboratory LyondellBasell National Aeronautics & Space Administration Naval Facilities Engineering Command New York Power Authority **NOVA** Chemicals Corporation Nuclear Decommissioning Authority Nutrien **Occidental Petroleum** Corporation

ONEOK, Inc. **Ontario Power Generation** Petronas Phillips 66 Public Service Electric & Gas Company **Reliance Industries Limited** (RIL) SABIC - Saudi Basic Industries Corporation Sanofi Shell Global Solutions US Inc Smithsonian Institution Southern Company TC Energy Tennessee Valley Authority

- The Dow Chemical Company The Procter & Gamble Company The Williams Companies, Inc. U.S. Army Corps of Engineers U.S. Department of Commerce/NIST U.S. Department of Energy
- U.S. Department of State U.S. General Services Administration Veteran's Administration Zachry Corporation

#### **SERVICE PROVIDERS**

Accenture Alvarez & Marsal Asite Autodesk, Inc. AVEVA Solutions Ltd. AWP University Bentley Systems Command Alkon Construct-X, LLC Continuum Advisory Group Dassault Systèmes SE Deloitte Detect Technologies DyCat Solutions EPM Group ASI Hilti Corporation I.M.P.A.C.T. iConstruct Insight-AWP Inc. Layher, Inc. O3 Solutions Oracle USA, Inc. Pathfinder, LLC PTAG, Inc. SkyCam Aviation, Inc. T. A. Cook Consultants Inc Trillium Advisory Group Ltd. Valency Inc. Verum Partners Zurich



### Valuable Collaboration

PIP (*Process Industry Practices*) develops and implements common industry practices for facility design, procurement, construction, operations, and maintenance that help reduce a facility's total cost of ownership. Members share their collective wisdom by collaborating to define and document best practices for all members to use while pursuing a long-term goal of digitally delivering PIP practices.

Together, members stay on top of emerging trends in more than 500 PIP practices that are arranged by disciplines.

#### P DISCIPLINE CATEGORIES

PROCESS, MECHANICAL, PIPING, CSA, I/E, DATA MANAGEMENT

www.pip.org/practices

#### CONTRACTORS

AECOM ATSI Audubon Bechtel Burns & McDonnell Burrow Global CDI Corporation Chemex Global Clough CTCI Fluor GIS Engineering Hargrove & Assoc. IHI E&C International Corporation IQA Solutions ITAC Jacobs JGC America Job Industrial KBR Kent Keystone Engineering Kiewit Engineering & Design McDermott Merichem Merrick & Company Mott MacDonald NORAM E&C OnQuest POWER Engineers, Inc. Preferred Engineering Samsung Technip Energies TWD UniversalPegasus International Wood Worley Zachry

#### OWNERS

**3M** Company AdvanSix Aera Energy Air Liquide Advanced Materials Archer Daniels Midland (ADM) Arkema Ascend Performance Materials BASF Corp. **Bayer Group** BP **Buckeye Partners** Cargill Celanese

Chevron CITGO Cornerstone Chemical Covestro DuPont Eastman Elementis Evonik ExxonMobil **Firestone Polymers** Flint Hills Resources **FMC** Corporation FutureFuel Chemical Co. **Grupo Petrotemex** (GPT)

Hess Corporation Hexion Honeywell Honeywell UOP Huntsman Hydrite Chemical Indorama Ventures **INEOS Olefins &** Polymers **INEOS Styrolution** Innophos International Paper (IPaper) Invista Koch Industries, Inc. LANXESS Corporation

Livent LSB Industries LyondellBasell Methanex Mitsubishi Mosaic Fertilizer Motiva Enterprises LLC Nacero Nuclear Fuel Services Nutrien Occidental Oil & Gas OLIN Corp. OQ (formerly OXEA Corporation) Pembina Pipeline Phillips 66

**PPG** Industries **PVS** Chemicals REXtac, LLC SASOL Saudi Basic Industries Corporation -SABIC Sekisui Specialty Chemicals Sempra LNG Targa Resources The Lubrizol Corp. Westlake Chemical Williams Companies Zeon Chemicals L.P.

### 2021 Financial Report

Construction Industry Institute, The University of Texas at Austin 2021 Financial Report | December 31, 2021

Does not include financial information for PIP

	YTD (12/31/2021 <b>)</b>
REVENUES	¢744.000
Contract & Grants Gifts & Contributions	\$744,833
	4 282 022
Member Dues	4,283,922
Events / Meetings	807,910
Education / Training	392,865
Licensing and Commercialization	76,087
Administrative Services (Subsidiaries)	60,000
TOTAL REVENUES	6,365,617
EXPENSES	
Research at UT	403,002
Research External	712,217
Development at UT	232,572
Development External	135,343
Marketing	92,476
Events / Meetings	760,304
Education / Training	188,840
Administrative Services	198,512
Staff Salary and Fringe Benefit	2,610,234
Travel	73,316
Overhead - UT	50,927
Overhead - Research Project	97,132
Director's Discretionary	6,000
TOTAL EXPENSES	5,560,875
CHANGE IN AVAILABLE FUNDS BALANCE	804,741
BEGINNING AVAILABLE FUNDS BALANCE	2,062,683
ENDING AVAILABLE FUNDS BALANCE	\$ 2,867,425
COMPOSITION OF AVAILABLE FUNDS	
Required reserves	\$1,375,000
Director's discretionary	94,000
CCIS	76,771
Other available funds	1,321,654
ENDING AVAILABLE FUNDS BALANCE	\$ 2,867,425
ENDING AVAILABLE FONDS BALANCE	\$ 2,007,425

### Independent Accountants' Report

### **Dunagan + Jack LLP** Certified Public Accountants

INDEPENDENT ACCOUNTANTS' REPORT ON APPLYING AGREED-UPON PROCEDURES **DECEMBER 31, 2021** 

To the Management and Board of Advisors **Construction Industry Institute** Cockrell School of Engineering The University of Texas at Austin

We have performed the procedures enumerated below on Member Dues and Available Funds reported in Construction Industry Institute's (Institute) 2021 financial report. The Institute's management is responsible for Member Dues and Available Funds reported in the 2021 financial report.

The Institute's management has agreed to and acknowledged that the procedures performed are appropriate to meet the intended purpose of reporting to the Board of Advisors. This report may not be suitable for any other purpose. The procedures performed may not address all the items of interest to a user of this report and may not meet the needs of all users of this report and, as such, users are responsible for determining whether the procedures performed are appropriate for their purposes.

The procedures and associated findings are as follows:

- We obtained from management the 2021 financial report to be included in the annual report.
- We obtained from management certain financial reports from \*DEFINE, The University of Texas at Austin's software that accounts for the Institute's financial transactions.
- We obtained from management the QuickBooks company file that the Institute uses to supplement \*DEFINE for financial reporting purposes.
- We have provided below a reconciliation of the Institute's "member dues" revenues from membership payments reported in \*DEFINE to the 2021 financial report.
- We have provided below a reconciliation of the Institute's ending "available funds" balances from \*DEFINE to the 2021 financial report.

#### Reconciliation of Member Dues per \*DEFINE to the 2021 financial report:

Membership payments received per *DEFINE:		4,208,500
Reconciling items:		
Add: 2021 member dues accrued (receivable)		520,020
Add: 2021 member dues received (deferred) in prior year		485,210
Less: 2020 member dues accrued in prior year		(509,900)
Less: 2022 member dues deferred		(514,800)
Add: 2021 Globalization Affiliate fees collected		95,030
Less: Unreconciled difference		(138)
Member dues reported in financial report	\$	4,283,922

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#### **2021 FINANCIALS**

#### Independent Accountant's Report - Continued

#### Reconciliation of Available Funds per \*DEFINE to the 2020 financial report:

Free balances per *DEFINE:		402,822
Add: Encumbered funds (not yet spent)		1,870,807
Adjusted free balances per *DEFINE:		2,273,629
Reconciling items:		
Add: 2020 member dues accrued (receivable)		509,900
Add: Cockrell O/H rebate (receivable)		43,351
Add: Other accounts receivable		120,412
Less: 2021 member dues deferred		(485,210)
Less: 2021 Executive Leadership Program revenues deferred		(146,300)
Less: Accounts payable and accrued expenses		(172,109)
Less: CCIS Funds		(76,771)
Less: OS2 IAP Funds		(4,219)
Less: Miscellaneous reconciling items		—
Ending available funds balance reported in financial report	\$	2,062,683

We were engaged by Construction Industry Institute to perform this agreed-upon procedures engagement and conduct our engagement in accordance with attestation standards established by the American Institute of Certified Public Accountants. We were not engaged to and did not conduct an audit or review, the objective of which would be the expression of an opinion or conclusion, respectively, on Member Dues and Available Funds reported in the Institute's 2021 financial report.

Accordingly, we do not express such an opinion or conclusion. Had we performed additional procedures, other matters might have come to our attention that would have been reported to you.

We are required to be independent of Construction Industry Institute and to meet our other ethical responsibilities, in accordance with the relevant ethical requirements related to our agreed-upon procedures engagement.

This report is intended solely for the information and use of Management and the Board of Advisors of the Institute and is not intended to be and should not be used by anyone other than these specified parties.

UNAGAN JACK LLA

Austin, Texas February 25, 2022

3724 Jefferson Street \* Suite 307 \* Austin, Texas 78731 \* (512) 420-8997 Main \* (512) 420-2399 Fax www.dunaganjack.com

#### 2021 AWARD RECIPIENTS

#### CARROLL H. DUNN AWARD OF EXCELLENCE

For significant contributions in the construction industry that demonstrate leadership to a high degree of dedication to improving cost, scheduling, quality and safety of the capital facilities process.



**Wayne Crew** Industry leader, CII Member, then ultimately the CII Director. Wayne dedicated his career

to improving the engineering and construction industry by preparing its future leaders for success and demonstrating a strong commitment to safety.

#### RICHARD L. TUCKER AWARD FOR LEADERSHIP AND SERVICE

For an active CII member that furthers the mission of CII through leadership. mentoring/advocating and ambassadorship.



**Steve Cabano** Supportive leader who brings more than 30 years of project expertise to CII. When he served as

CII Chair in 2019, the Board of Advisors relied on his advice and leadership across CII's most important initiatives. Steve served on several CII research teams and on committees as diverse as Benchmarking, Implementation, and Strategic Planning before chairing the Executive Committee.

#### JAMES B. PORTER, JR. AWARD FOR **TECHNOLOGY LEADERSHIP**

Recipients show significant technology contributions to the construction industry while demonstrating personal dedication to the development and advancement of these technologies within capital projects.



Dr. Carl Haas From RFID to digital twin, this dedicated educator and researcher from the University of Waterloo

has dedicated his career to exploring how technology improves construction projects, especially in the areas of automation and robotics.

#### 2021 STAFF LIST



**STEPHEN P. MULVA** Director



KIM ALLEN Director of Operations



JENNIFER BIEN Associate Director for Membership and Communications



**TERRI BUVIA** Executive Assistant



DEBORAH DEGEZELLE Manager of Information Services



DANIEL OLIVEIRA Associate Director for Funded Studies



JOHN PALMER

Associate Director for Technology

Associate Director



HONG ZHAO Manager of **Financial Services** 



BERNIE ROSENBLATT DEBBIE SAMILPA **BOB WIBLE** 

Research Assistants AMELIA CELOZA ZHE YIN

#### **CII MISSION**

The mission of CII is to provide a research and development platform to create and drive innovative solutions that tangibly improve business outcomes through an academically-based, disciplined approach.



CII | The University of Texas at Austin 3925 W. Braker Lane (R4500) Austin, Texas 78759-5316 (512) 232-3000

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