Knowledge to Practice:

aci Foundation

ACIF Fellowships Set Student on Path to Success

Bringing the best and brightest students to ACI has long been the mantra of the ACI Foundation (ACIF) Fellowship founders and the Foundation's Scholarship Council. These efforts were recently amplified when 80 individuals, friends, and colleagues of the late Dan Falconer, along with ACI, raised the funds to create the Daniel W. Falconer Memorial Fellowship to honor Dan, who served as ACI Managing Director of Engineering for more than 17 years.

Bjorn Vors, the first recipient of this fellowship, has been a student member of ACI for the past 3 years, and he is the type of high-potential student that Dan would certainly have approved. Within his time as a student member, Vors has become a two-time ACIF Fellowship recipient—awarded the 2016-2017 Elmer Baker Fellowship in addition to the 2017-2018 Daniel W. Falconer Memorial Fellowship—and an Associate member of ACI Committee 345, Bridge Construction, Maintenance, and Repair. This past summer, through the Falconer Fellowship, he completed an internship with the ACI Engineering Department at ACI Headquarters. Did you catch all of that? Vors' credentials attest to his passions for education, collaboration, and concrete.

Vors' interest in engineering began years before he connected with ACI, when he worked as a civil engineering technologist intern. While he enjoyed the work, being a technologist intern did not allow him to design and certify the projects he was working on. Vors wanted to have a larger role in the engineering of structures. This desire led him to enroll at the University of Saskatchewan in civil engineering. It was at university that Vors was introduced to ACI by Professor Lisa Feldman, FACI. Feldman encouraged him to become a member of the local ACI chapter and to explore the ACI Foundation's fellowships and scholarships.

Looking to the future, Vors will be completing his MS in civil engineering at the University of Saskatchewan. Upon graduation, he plans to work in the design industry for several years and is especially interested in coastal and marine design. Vors' long-term career aspirations include pursuing his PhD and transitioning into research and teaching at a university. It is with these goals in mind that Vors values his continued participation with ACI.

"The reason ACI is so successful is its members," Vors said. "I want to work with others who are going in the same direction I am—people who are trying to move the concrete industry forward. Getting involved with ACI was the highlight of my bachelor's degree; I know my continued involvement will be tremendously impactful with my coursework and beyond."

"Working at ACI Headquarters was an extremely rewarding experience. I was able to work with the ACI engineering staff on several ACI documents, and I gained an appreciation for the importance of consensus technical documents for the industry," Vors said.

Bjorn Vors recently completed an internship in the ACI Engineering Department as part of the Daniel W. Falconer Memorial Fellowship

Sustaining and growing the ACI Foundation Fellowships and Scholarships Program would not be possible without the generosity of many ACI individual members, chapters, and companies. It takes all of us to make a difference. On behalf of the recipients, staff, and Foundation leadership: Thank you.

SDC Brings Innovation to ACI Convention

The Strategic Development Council (SDC) will host its newly named "Innovations in Concrete Technology Session" at The ACI Concrete Convention and Exposition – Fall 2017, in Anaheim, CA. The 2-hour session will take place on October 15, beginning at 3:30 p.m. PST, and it will showcase emerging concrete technologies that the SDC perceives as having positive productivity or economic impacts on the industry.

The event will be co-moderated by Anik Delagrave, Lafarge Holcim, and Steven H. Kosmatka, Portland Cement Association. Four presentations will be given:

Zero Thermal Supplementary Binder and Additive—Zero Thermal™ is a patented algae-based supplementary binder and additive for concrete. Molecular biomineralization creates a visco-elastomeric polymer that allows for a 68% USDA-certified bio-based additive for cement and concrete. It displays both hydrophilic and hydrophobic properties for superior water and efflorescence control. Zero Thermal works through exothermic reaction and formation of covalent bonds, and is a monolithic technology when used in concrete. This nanotechnology can encapsulate larger-diameter air bubbles in concrete to form a cellular concrete structure, imparting lightweight concrete densities with superior tensile and compressive strengths.

Utilization of CO_2 for Limestone Aggregate—Of the 40 gigaton (Gt) of anthropogenic carbon dioxide (CO_2) emitted annually, over half is released from large industrial plants, including coal- and gas-fired power plants, steel mills, and cement plants. This CO_2 can be converted into limestone aggregate with similar properties to natural limestone aggregate. Worldwide, over 50 Gt of aggregate is mined

annually, some of which is used in concrete, so the carbon footprint of concrete can be offset by using sequestered carbon aggregate. Using this manufactured aggregate, concrete mixtures can be formulated to be carbon-neutral or carbon-negative. The portland cement component can also be rendered carbon-neutral when the CO_2 source is a cement plant.

NASA's Centennial Challenges Program—NASA's 3-D Printed Habitat Challenge seeks to foster development of construction technologies to additively manufacture a habitat using local indigenous and recyclable materials to enable space exploration and improve life on Earth. NASA's Centennial Challenges Program uses incentivized prize competitions to accelerate technology development and crowdsourcing for innovative solutions. The challenge is more than half complete. The final phase of the challenge will be considered a success only if NASA, academia, and industry use the results.

Transforming Construction by Carbon-Neutral Cementation and Digital Fabrication—This presentation will discuss pathways for achieving carbon-neutral cementation and digital fabrication in construction. Special focus is placed on identifying means to enable CO_2 uptake by cementing materials, scalability, and at low cost using available CO_2 sources. Further discussion involves means for manipulating the rheology of these new cementation agents, to make them amenable to digital (3-D) fabrication to produce construction sections with optimized geometries and unparalleled strength-to-weight ratio.

Concrete Research Council's Annual Request for Proposals

The ACI Foundation's Concrete Research Council (CRC) seeks to advance the concrete industry through funding of various concrete research projects that further the knowledge and sustainability of concrete materials, construction, and structures. The CRC is currently requesting proposals for grant funding. Submission information along with more detailed proposal requirements are available at **www.concreteresearchcouncil.org**.