



## SCHOOL OF ENGINEERING CLASS OF 2021

*Back row: Elisha Devadhas, Harley Robert Craig, Aaron Wendel, Isaac Fulton, Dr. Sophie Liu, Ememubong Ekwere, Prof. Robin Akbar, Dr. Xiaomin Ma, Dr. Daobin Zhang, Dr. John Matsson, Dr. Charles Baukal, Sean Curtis, Samuel Nelson, Michael Afolabi, Benjamin Weir, Karl Minko Mi Nguema, Emmanuel Nieves*  
*Front row: Joel Gonzalez, Jacob Honel, Stuart Nelson, Blake Jackson, Michael Guffey, Praise Olukilede, Edward Jordan, Chernet Coleman, Samuel Tandeka, Aaron Mallett, Michael Vandusen, Chloe Busse, Geoffrey Willis, Mauricio Onoro, Jaden Rodgers, Joshua Schmid, Landon Pop, Yujin Hong*

## SUMMER INTERNSHIPS

*Kasey Spigle, Kalmar USA Inc.*

**THIS SUMMER I WORKED AT A COMPANY THAT MAKES TERMINAL TRACTORS CALLED KALMAR USA INC.,** located in Ottawa Kansas. The company was founded in 1943 in Ottawa Kansas and was originally called Ottawa Truck. Now the company is based in Helsinki, Finland and is currently the leading manufacturer of terminal tractors in the world, delivering over 70,000 trucks since the birth of its existence. The product being manufactured at the

plant in Ottawa is the Ottawa T2 truck. To put it simply, the terminal tractor is a semi with a shorter wheel base and a 360 degree view cabin allowing for easier control and maneuverability. Kalmar trucks also have a hydraulic fifth wheel that allows them to quickly move trailers around ports, railways and shipyards.

At Kalmar, I worked in the order management department where my job title was order management

engineer. One of my main duties at Kalmar was structuring BOMs (Bill Of Materials) for sales orders. Almost everything on the Kalmar trucks is customizable so I had to read a sales order and determine what parts I needed to include in the BOM based on incompatibilities and such. It was also my job to determine whether or not the order was going to require special engineering to account for incompatible options.

Another project I worked on at Kalmar was migrating data from multiple databases into one system while keeping the integrity of the data. I also wrote a new process for data entry into the new system and looked for ways to save time and money by streamlining the data entry process.

The last ongoing project that I did and am currently working on is helping to write a program that will take a sales order and automatically configure a BOM from it. This requires extensive knowledge of the Kalmar truck as well as some coding experience in Excel. My job while working

on the BOM config. Team is to test BOMs from trucks that have already been manually configured and see where the holes are when compared to the BOM configurator. If there are differences in the comparison I have to figure out whether the configurator is wrong or the person who manually did it was wrong. Based on the results I may need to adjust the configurator coding or even change the configuration rules.

All in all, I loved my job at Kalmar this summer and I am even continuing my internship through the fall semester. I learned to work well with others as well as find the best way to efficiently accomplish tasks on my own. While I wasn't doing mechanical engineering work, the schooling still really came in handy when looking at blueprints and it helped me communicate with the engineering team as well. Ultimately, I am very grateful to God for blessing me with the opportunity to work this summer. ♦

## INTERNSHIP EXPERIENCE AT WEBCO INDUSTRIES

*Kristoffer Matsson*

**THIS SUMMER, I HAD THE OPPORTUNITY TO WORK AS A MECHANICAL ENGINEERING INTERN FOR WEBCO INDUSTRIES** located in Sand Springs, OK. While working for Webco, I was given two main projects that would take most of my time during the summer. The first project given to me was to update an outdated dip tank system which involved heavy use of CAD software such as SolidWorks and AutoCAD. By using these programs, I was able to design models for what the updated tank system would look like and how the components would all fit and work together.

Part of the process also involved communicating and working with colleagues in ways such as holding meetings and tracking progress via email. Meeting with contractors to discuss logistics and any sourced components was also an eye-opening experience to how engineers work with other people.

My second project involved automating an adjustment stand which was a mechanism involved in the process of the tube manufacturing process. This automation required the use of a gearmotor as well as independently designed mounting system which would support the motor. Selecting the right components for this system such as the gearmotor required basic knowledge of torque and power needed for functionality.

The mounting system involved the design and fabrication of components using such as a face flange, coupling, and key. These components were made using Webco's machine shop.

Getting this internship took much work and patience but in the end it was worth it. I would highly recommend Webco as a company for anyone who likes the idea of raw mechanical engineering, CAD design, and working for a smaller sized private company in the steel industry. ♦



KRISTOFFER MATSSON PRESENTING TO COLLEAGUES AT WEBCO

## INTERNSHIP IN WASHINGTON D.C.

*Andrew Jensen*

**MY NAME IS ANDREW JENSEN AND I AM AN ENGINEERING PHYSICS STUDENT WITH A MINOR IN PRE-LAW HERE AT ORU.** This summer I served as an intern for U.S. Senator Mike Rounds (R-SD) in his Washington D.C. Office. My responsibilities included tracking legislation, researching bills, attending committee hearings and briefings, providing legislative support and handling constituent phone calls. I also had the opportunity to meet other U.S. Senators, learn more about the legislative process in the U.S. Senate, collaborate with other interns from across the nation and visit historical sites in and around Washington D.C.

The core issues I focused on during the summer were energy, environment, infrastructure and agriculture. One of my projects was working with the White House Council on Environmental Quality regarding the deployment and the efficient, orderly and responsible use of Carbon Capture, Utilization and Sequestration (CCUS) technologies. CCUS refers to technologies that can remove carbon dioxide and other pollutants from the atmosphere and permanently sequester them. CCUS works by 1) capturing carbon dioxide from power plants or other industrial sources, 2) transporting the captured and compressed carbon dioxide—usually by pipeline—and 3) sequestering the carbon dioxide in rock formations deep underground. Since more than 40% of all carbon dioxide emissions are from power generation plants, CCUS could play a significant role in reducing greenhouse gas emissions in the United States. Implementing CCUS technologies at power plants could reduce carbon dioxide emissions from a power plant by up to 90%. Additionally, investing in implementing CCUS technologies, as well as other clean environment technologies, could help generate thousands of jobs for engineers and other skilled workers.

This summer I saw first-hand how important public policy is to the field of science, and vice versa. The allocation of funds by congress for research, development and implementation often determines which engineering projects become reality. However, congress relies on the expertise of engineers and other scientists when making



ANDREW JENSEN IN WASHINGTON D.C.

decisions on funding. As scientists, we have a responsibility to stay engaged in the realm of politics to ensure that those in charge continue to make informed decisions regarding investing in and regulating the sciences. ♦



AERIAL VIEW OF SWRI

## ENGINEERING CONSULTANT - R & D

*Gabriel Kanelopoulos*

**STARTING AT ORU IN THE FALL OF 2012, I HARDLY KNEW WHY I WAS PURSUING AN ENGINEERING DEGREE.** I had done well in science and math during high school, but I certainly wasn't your standard techie type. I did gravitate towards innovation and problem solving, and I also knew engineers could make a decent wage, so I just went for it. Initially enrolled in mechanical engineering, I took the standard courses freshman year and things



GABRIEL KANELOPOULOS

went well. I recall my most difficult course being Chemistry 111. Then, at the start of sophomore year, I took Dr. Liu's Engineering Computational Methods. Matlab, C, Unix — I had never heard of such things. After getting my feet wet, I started to see the puzzle-like enjoyment of building a solution through

programming. After some research into the field, I decided to join the Computer Engineering track. Fast-forward five years from graduation, and I've been blessed with an incredible career start at the Southwest Research Institute (SwRI) headquartered in San Antonio, TX. SwRI is one of the oldest and largest private, non-profit applied research and development institutes in the US (1,500 acres and 2 million sq ft of labs). With nine technical divisions

covering a range of industries from space sciences to automation and robotics, there is no shortage of new and exciting innovation. Personally, I've been able to use both my software and hardware foundations as a computer engineer. I have developed, deployed, and maintained enterprise software solutions across the US for multiple state's Department of Transportation. Recently, I have been developing high-reliability embedded systems software for aerospace applications. I can proudly say that I'll have software running aboard spacecraft in the coming years. As advice to current engineering students, don't be too quick to write yourself off as "not a programmer". Even if you are not in the Computer Engineering track, your ability to master software development and/or the use of software tools will only help you in your career. Knowing these tools will also help you stand out when applying for jobs, and keep you ahead of the pack once you are there. If you are interested in software, here is a list of in-demand skills worth checking out: front-end web application frameworks like React.js or Vue.js, back-end Javascript environments like Node.js, and scripting languages like Python. For low-level programming and embedded systems, you will need to be good at C/C++ and have familiarity with operating systems like Linux/Unix, or real-time OS like FreeRTOS or VxWorks. Also, one thing I wish I had done while at ORU is to rub shoulders with the business students and look for opportunities to start entrepreneurial projects. Work hard, dream big, and enjoy yourself along the way. God will use you mightily. ♦



## ALUMNI NEWS

Kevin Stark

ATOP THE ROLLING HILLS OF WESTERN KENYA'S RIFT VALLEY STANDS A CONCRETE SIGN PAINTED YELLOW WITH THE BLACK BLOCK LETTERING "TENWEK HOSPITAL – WE TREAT, JESUS HEALS". God has blessed this mission hospital for over 80 years, using it to show the good news of Jesus, healing people in body, mind, and spirit. Over the past 35 years, its mission has transformed to become a place of discipling and sending medical professional Christ-followers to all corners of Kenya and the African continent.

We have now been a part of the work going on in Tenwek Hospital for over 10 months, arriving in the middle of a global pandemic with our three boys (6, 4, and 2 years). God has long placed a call on our lives to help train and send out mission-minded medical professionals to minister to women and mothers of the world. Now God has led us to be a part of pioneering one of the first ever missions-oriented OB/GYN residency training programs in the world at Tenwek Hospital.

Women have long been the back-bone of African society, upholding the family life, spiritual life, and economy of their communities. However, there are very few physicians trained specifically in women's health, and



ORU ALUMNI KEVIN STARK (2010 BS ENGINEERING, MECHANICAL) AND DR. MOSELLE STARK (2009, BS BIO-PRE-MED) AT TENWEK HOSPITAL IN KENYA.

African women suffer as a result. Nearly 2/3 of all maternal deaths that occur in the world during childbirth happen on the African Continent. In addition, there are very few professionals who can perform gynecological surgeries in Kenya and Africa as a whole. Many life-threatening, yet treatable gynecological diseases go unaddressed.

The vision for the Tenwek OB/GYN residency is transformation of women's health in Kenya and beyond to the African continent through multiplication of Christian OB/GYNs. Train, disciple, and send out OB/GYN physicians with a missional, discipling mindset who will then go out and train, disciple, and send out OB/GYNs further and more

effectively than any “mzungu” (white person) ever could.

The mission is “40 by 40”: 40 African OB/GYN physicians sent out to practice, disciple, and train others in the African continent by 2040.

We have already seen God at work in the hospital in the existing ministries and training programs. We have met and said goodbyes to wonderful Kenyan medical professionals who have already been sent out to change the medical and spiritual landscape of their countries. Now we are poised and ready to kick off the OB/GYN program with the first class of 2 residents selected and ready to begin their journey in January of 2022.

### PLEASE PRAY FOR US!

Please pray as final preparations are being made to get the program off the ground.

Pray that God would be glorified as Moselle uses her giftings as a teaching physician, and that she and the other faculty would be able to learn and teach the information essential to serving women in Kenya and developing areas of Africa.

Pray that the work of discipleship would never lose priority to the medical work, and that priority of following Jesus first would continue in lives of the doctors who graduate this program.

Pray for me, Kevin, as I currently focus on the family as my primary mission field, and participate in the work of fostering community for students and their families. ♦

If you would like to share in our journey:

1. Check out more info and blog entries at [JourneyWithTheStarks.com](http://JourneyWithTheStarks.com)
2. Join our newsletter email list at [tinyurl.com/StarkNewsletter](http://tinyurl.com/StarkNewsletter)
3. Request to join our facebook group at [tinyurl.com/StarkFBGroup](http://tinyurl.com/StarkFBGroup)
4. Partner financially through our sending organization, World Gospel Mission at [wgm.org/stark](http://wgm.org/stark)

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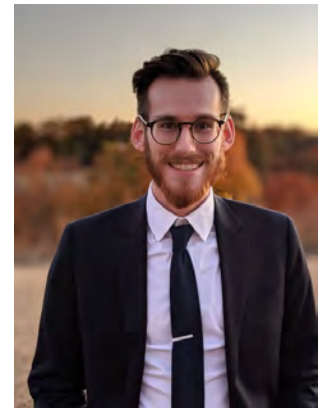
## CULTURAL DIFFERENCES AND WORKING IN A GLOBAL CONTEXT

*Daniel Dickie*

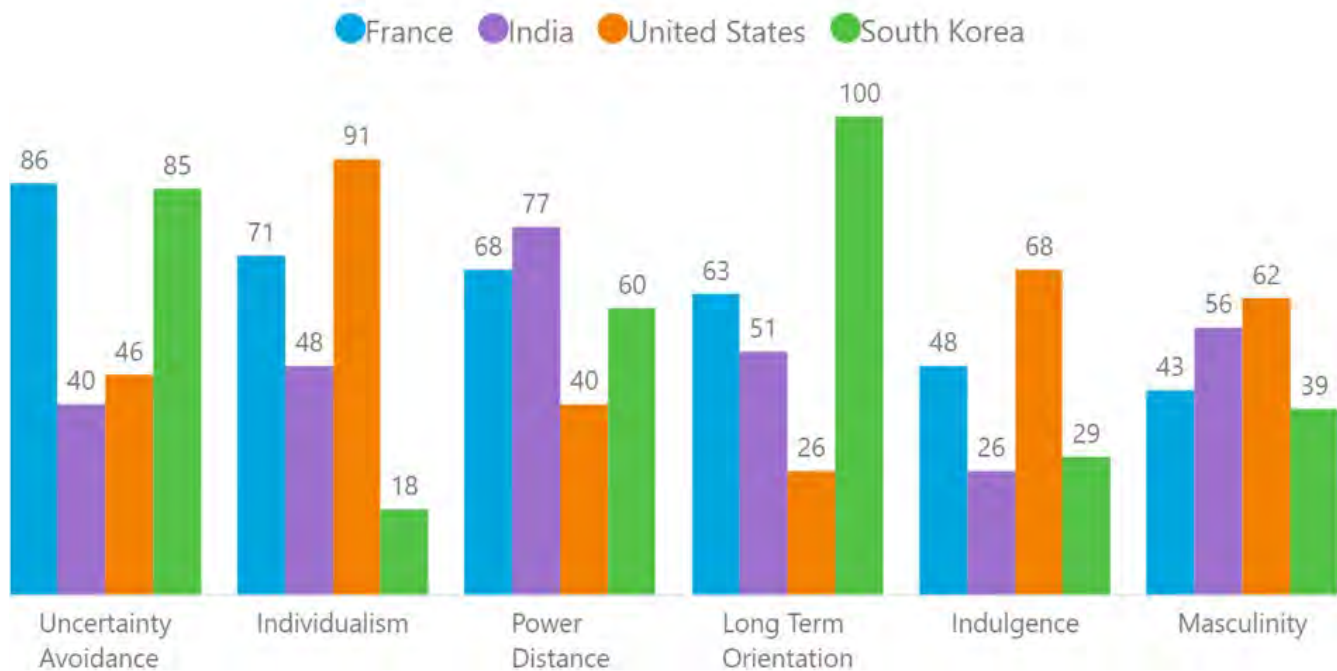
**HI, MY NAME IS DANIEL DICKIE, AND I'M THE MANAGER OF STANDARDIZATION AT KOCH ENGINEERED SOLUTIONS** with a primary focus on the equipment supply businesses. In my role, I'm responsible for making global standards that support the engineering and design teams to make our products higher quality, faster to design and manufacture, more consistently designed and engineered, and more cost effective. I'm based in Tulsa, Oklahoma, but since my role has a global focus, I work with culturally diverse teams day in and day out.

Take, for example, a recent project I've been working on to assess how we are acquiring knowledge and sharing feedback. During normal business hours I met with team members across the US and Canada that represented 6 different office locations. Then, in the middle of the night I met with team members that represented 9 additional office locations in Asia and Europe. For a single project I collaborated with approximately 50 individuals that represented 9 different countries and 15 different office locations! That's quite the culturally diverse team. In my past roles in project management and applications

engineering, I've had the opportunity to work with international teams, including teams based in Thailand, Philippines, China, and Japan. I've also had the opportunity to travel to Belize, Hong Kong, and Taiwan with upcoming trips planned to Ireland and Italy. Even so, more and more recently I've been aware of cultural differences and how these might come into play in working in a global context. The renowned social scientist, professor, and cross-cultural researcher Geert Hofstede is well-known for developing a framework for measuring cultural dimensions that I've found helpful for understanding these differences. These dimensions include 1) Power Distance, 2) Individualism vs Collectivism, 3) Uncertainty Avoidance, 4) Masculinity vs Femininity, 5)



DANIEL DICKIE



Long Term vs Short Term Orientation, and 6) Indulgence vs Restraint.

How is this framework helpful? In the project I mentioned earlier, I interacted with team members from France, India, South Korea, and the United States among other countries. The chart above shows the values for each country across Hofstede's 6 dimensions. While there may be some similarities between countries on a certain dimension, you can see that there are quite a number of differences as well. For a project that is focused on acquiring knowledge and sharing feedback, how might cultural differences influence how different team members view a certain topic? Might a lower Power Distance country (such as the US) view sharing feedback to upper management differently than a higher Power Distance country (such as India)? Might a lower Individualism country (such as South Korea) view acquiring knowledge differently than a higher Individualism country (such as France)? These questions and more emerge and can help drive meaningful and thoughtful discussion when given space to be considered. On the other hand, if cultural differences are ignored, some important insights could be overlooked.

While I'm working more and more in a global context

in my current role, ORU is where I first gained experience interacting with different cultures. During my studies, I had professors from Sweden, China, Russia, and the UK. I interacted with classmates from Honduras, Nigeria, Ghana, India, and Mexico. I travelled to Canada to present at an ASME conference and Burkina Faso with the missions and outreach department. Each of these experiences was different, but all of them gave me a deeper appreciation for and understanding of different national cultures. My time at ORU was richer for these opportunities to engage with different cultures.

I'd like to share one piece of parting advice that I wish I could share with my younger self. If you notice cultural differences either working or studying in a global context, remember that these differences are just that – differences! Differences are neither bad nor good, they just are. It can be a new experience to interact with someone from a culture you are unfamiliar with. If you are willing to work to understand, appreciate, and respect culture differences, you might learn a thing or two, you will certainly learn new perspectives, and I guarantee you will make friends along the way.

If you want to continue the conversation, connect with me on LinkedIn at [linkedin.com/in/daniel-dickie](https://www.linkedin.com/in/daniel-dickie). ♦

<sup>1</sup>For a more extended description of the dimensions and cultural layers, visit <https://hi.hofstede-insights.com/national-culture> and <https://news.hofstede-insights.com/news/what-do-we-mean-by-culture>

## THE PURSUIT OF ENGINEERING SUCCESS

Richard D. Kirby, PE, MEng, ORU BSE 1992

**YOUR ENGINEERING CAREER WILL PROVIDE OPPORTUNITIES TO BE CREATIVE AND INNOVATIVE**, as you apply practical engineering principles, science, and mathematics to solve today's challenges. Engineers are constantly creating, maintaining, sustaining, optimizing, and upgrading essential and needed infrastructure for our growing infrastructure-dependent civilization. It takes engineers like you to create ingenious gadgets, computer-based applications, electric cars, structures, etc. Although you will face challenges and limitations, you will have the privilege to improve people's lives and their environment around the world, while reducing risks to their health, safety, prosperity, and wellbeing. I currently have the pleasure of collaborating with peers in the electric power delivery industry – keeping the lights on.

How can you become empowered to practice engineering with confidence and success? I advise engineering students to consider the following:

1. Be a summer engineering intern before graduation.
2. Join a technical professional organization, such as IEEE.
3. Take the Fundamentals of Engineering (FE) exam in your senior year or within one year of graduation.
4. Get hired as an associate engineer upon graduation.
5. If possible, work under a registered Professional Engineer.
6. Gain professional experience and continue learning.
7. Learn your state's (for those within the USA) licensure Laws and Rules.
8. Prepare for and take the Principles and Practice of Engineering exam (PE exam) when eligible.
9. Coauthor a technical paper.
10. Patent your ideas.
11. Select projects, assignments, and challenges you will enjoy.
12. Trust God with your future. Seek Him to guide you throughout your career.
13. Learn from failure and setbacks. Make improvements and adjustments for future success.
14. Embrace change, stay flexible, and be open to new career opportunities.

As stated above, consider growing your engineering career by becoming a Professional Engineer (PE). The Texas Board of Professional Engineers and Land Surveyors states, "You worked hard to graduate with an engineering degree. You have increased your competence through practical engineering work experience. Now is the time to take the initiative and reach your goal. Show the world what you can do – apply to be a Texas licensed Professional Engineer today."<sup>1</sup>

In the USA, every state regulates the practice of engineering to ensure safety by licensing Professional Engineers (PEs). The PE is granted the authority of direct control and personal supervision of the entire engineering team ("in responsible charge"). Additionally, the PE will exclusively prepare, sign, and seal engineering drawings and reports when performing professional services for public and private clients. PEs are responsible for the work and for the lives and environment affected by that work. Hence, they must produce high-quality work and maintain a strong work ethic.<sup>2</sup>

Those in need of engineering services will typically search and select the most competent, qualified, and licensed engineer available. Being a PE will enhance your career, and as you promote the profession, you'll gain more prestige, respect, independence, authority, flexibility, and compensation.<sup>1,3</sup>

To maintain your PE license, you must remain competent and improve your engineering skills through technical-related continuing education (CE) requirements and keep an annual CE record.<sup>2</sup>

In addition to joining a technical professional organization, technical conferences are unique opportunities for engineers to learn from their peers in their industry. Furthermore, technical conferences need authors to write technical papers that will be presented at the conference annually. Depending on the focus of the conference, technical papers can include research, application, or review papers.<sup>4</sup> As you continue your engineering career and gain experience, contemplate authoring or coauthoring a technical paper to publish your work. This will stretch you, advance your field, and teach your peers.

Publishing has additional benefits; your effort will be applied toward your CE requirements for your PE. Within IEEE, once the paper has been peer-reviewed, it may also be recommended for publication in the IEEE Transactions. For more info, regarding authoring IEEE journals, conferences, books, or magazines, see the IEEE Author Center at <https://ieeauthorcenter.ieee.org/>. If interested, I have provided information and links (at the end of this article) to two recent application type papers I coauthored. In conclusion, always strive for excellence. John C. Maxwell states it best, "Success is knowing your purpose in life, growing to reach your maximum potential, and sowing seeds that benefit others."

If you enjoy watching videos, you may view the following on YouTube or Vimeo:

- "The Value of the Professional Engineer (P.E.) License,"



Texas Society of Professional Engineers, at <https://www.youtube.com/watch?v=EdCFFImNISC>

- "The benefits of a PE license," NCEES, at <https://www.youtube.com/watch?v=3kfOuVuuO5g>
- "How to Publish a Technical Paper with IEEE," IEEE Xplore, at <https://www.youtube.com/watch?v=HpkvVuetPA8>
- "Dream Big: Engineering Our World," MacGillivray Freeman Films, at <https://vimeo.com/ondemand/dreambigfilm> ♦

#### References

1. Texas Board of Professional Engineers and Land Surveyors; "What are the benefits of being a licensed Professional Engineer?" Available at <https://pels.texas.gov/downloads/benefitsengineer.pdf>
2. National Society of Professional Engineers, "What is a PE?" Available at <https://www.nspe.org/resources/licensure/what-pe>
3. National Society of Professional Engineers, "Why Get Licensed?" Available at <https://www.nspe.org/resources/licensure/why-get-licensed>
4. IEEE Transactions on Power Delivery (PWRD), "Three Types of Papers" Available at <https://cmte.ieee.org/tpwrd/three-types-of-papers-interested-by-pwrd/>

#### **COAUTHORED 2021 TECHNICAL PAPERS**

##### **Field Experience With Ultra-High-Speed Protection, Traveling-Wave Fault Locating, and Circuit Breaker Reignition Detection on a 220 kV Line in the Kalahari Basin**

Frans Shanyata, NamPower  
Sthitaprajnyan Sharma, Deon Joubert, Richard Kirby,  
and Greg Smelich,  
Schweitzer Engineering Laboratories, Inc.

This paper shares NamPower's field experience with ultra-high-speed protection and traveling-wave fault locating on a 220 kV line. It discusses observations made from transient event records captured during a C-phase-to-ground fault on the line. It presents the performance of protection elements, fault locating, and transient recording capabilities, which have the potential to benefit system stability and aid with preventive maintenance of assets.

Presented at the 2021 PAC World Conference  
Available at <https://selinc.com/api/download/135138/>

##### **Double-Ended Traveling-Wave Fault Locating Without Relay-to-Relay Communications**

David López Cortón and Jorge Vaquero Melado, Red Eléctrica de España  
Jesús Cruz, Richard Kirby, Yusuf Zafer Korkmaz,  
Gianfranco Patti, and Greg Smelich,  
Schweitzer Engineering Laboratories, Inc.

This paper discusses how a transmission system operator in Spain successfully applied double-ended traveling-wave-based fault locating (DETWFL) offline when relay-to-relay communications were unavailable. It also discusses the possibility of using DNP3 over Ethernet to retrieve event information, allowing for automatic DETWFL calculations offline. Finally, it includes the analysis of a B-phase-to-ground fault to illustrate the performance of the applied offline DETWFL method.

Presented at the 2021 Texas A&M Relay Conference  
Available at <https://selinc.com/api/download/133822/>

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**Richard D. Kirby** is a senior product sales manager at Schweitzer Engineering Laboratories, Inc. (SEL) in Houston, Texas. His current focus is ultra-high-speed transmission line protection technology. He is a registered Professional



Engineer in Arkansas, Louisiana, Michigan, Oklahoma, and Texas. He has 29 years of diverse electric power engineering experience. In 1992, he received a BS in engineering (electrical) from Oral Roberts University in Tulsa, Oklahoma, and in 1995, he earned his Master of Engineering in electric power from Rensselaer Polytechnic Institute in Troy, New York. He is a senior

member of the IEEE Power & Energy Society and the Industrial Applications Society. He has coauthored and presented technical papers on electric power system protection topics.

Richard and his wife Sherrill have been happily married for 27 years and reside in Pearland, Texas. They have four children, a son-in-law, and a granddaughter. Anna Boyd (25) ORU BSN 2018, is a L&D Nurse in Houston, Texas; married to Bryant Boyd, parents of Rebecca Boyd (11 months). Matthew (24) ORU BS Fin 2019, is a Financial Representative at Inspire Financial Group, Tulsa, Oklahoma. Daniel (22) TAMU BS is an Aerospace Engineering 2022 student. Elizabeth (19) ORU BS is a Mktg 2024 student.