

SAN DIEGO ASSOCIATION OF GEOLOGISTS

<http://www.sandiegoeologists.org>

SDAG MEETING ANNOUNCEMENT

Thursday, May 21st, 2020

Student Presentations

Presented by:
Canyon B. Breyer
Faith Burkett
Sean Curran

Where: **Google Meet**
<https://meet.google.com/njs-wcig-sfc>
Join By Phone:
+1 314-656-8777 (PIN : 825387843)

When: 6:15 pm – Sign in Early
6:30 pm – Social Hour (byob)
7:00 pm – Announcements
7:15 pm – Presentations

Directions: Click on the link above sometime between 6:15pm and 6:45pm on Thursday May 21st, and it should take you to the meeting platform where you will be able to see the speakers' presentations and listen to them talk. There is also a phone link if you don't have a computer and just want to listen to the presentations but we've had bad luck with feedback when tuning in to the meeting with the phone, so computer is preferred. Please check in early to avoid interruptions during the meeting. The meeting will start promptly at 7PM with 5 to 10 minutes for announcements and then start the first speaker around 7:10. Please put yourself on mute during the meeting.

ABSTRACTS & BIOS

Development and Testing of an Economical Total Alkalinity Titration System Designed for Ocean Acidification Studies

Speaker: Canyon B. Breyer – Scripps Institution of Oceanography, UCSD

Although state-of-the-art systems can be obtained for the measurement of total alkalinity in seawater samples, such systems are overly complicated for many labs, and quite expensive to acquire (for example the high-quality system designed and used at the Scripps Institution of Oceanography would cost about \$30,000 in its entirety). The Global Ocean Acidification Observing Network (GOA-ON) proposed in 2015 that a suitable uncertainty goal for the measurement of total alkalinity would be $10 \mu\text{mol kg}^{-1}$, and noted that measurements of that quality would enable scientists to identify relative spatial patterns and short-term variations in the seawater chemistry that might be expected to affect the responses of organisms and ecosystems. Insofar as the Scripps System is capable of achieving an uncertainty of $\sim 1.5 \mu\text{mol kg}^{-1}$ when operated by an expert, it was felt that it was likely that a significantly simpler (and thus cheaper) system could be implemented from readily available parts while keeping the uncertainty reliably below the $10 \mu\text{mol kg}^{-1}$ goal. If this proves practical, such a system would be used widely in laboratories studying Ocean Acidification, both in the United States and in many other countries around the world.

The approach taken was to investigate carefully the implications for precision and accuracy of replacing expensive components in the Scripps System with cheaper alternatives, and having finalized on a design and tested it, to write a set of suitable Standard Operating Procedures that could be followed by others enabling them to achieve the appropriate measurement quality.

After taking the time to learn the principles underlying the measurement of alkalinity using the Scripps System, my first change was to perform the titrations manually (rather than using the full computer-controlled system.) It was also possible to process the titration data using a simple Excel spreadsheet, rather than relying on the calculations built into the measurement system. The sample size used was reduced from $\sim 130 \text{ g}$ to $\sim 50 \text{ g}$; this enabled the replacement of an expensive Swiss-made (Metrohm), stepper motor driven, burette with a far simpler (and cheaper) manually operated piston burette (by Gilmont) but which had a smaller capacity than the Metrohm buret (2 mL, compared to 5 mL). My initial work with this burette allowed me to show that, once I had developed a technique to calibrate the burette carefully it was possible to achieve a measurement uncertainty of $\sim 5 \mu\text{mol kg}^{-1}$. I am presently working on testing how best to use such a system without explicit temperature control (thus again reducing the costs, and also the footprint of the equipment in a laboratory by obviating the need for a thermostat bath). This work involves my considering in detail how a glass electrode system reading might change as a result of a temperature change, and investigating approaches to mitigate this.

The expected final outcome (in addition to a working system) is a manuscript for submission to *Limnology & Oceanography Methods*, and SOPS for (a) the burette calibration; (b) accurate calibration of the acid titrant that is used; and (c) a detailed procedure describing the titration itself.

Canyon Breyer is currently completing his final year as an undergraduate at University of California, San Diego under the Scripps Institution of Oceanography. He will be receiving his B.Sc with a major in Earth Science and a minor in Marine Science, and plans to further advance his education with the Scripps Institution of Oceanography by earning a Master's degree in Earth Science next year. He began working in Dr. Andrew Dickson's seawater carbon chemistry laboratory October of 2018 and has pursued a deeper understanding of the importance of analytical chemistry as a means for studying seawater chemistry, specifically in regards to total alkalinity. His research thus far has been focused on developing and testing a new economic total alkalinity titration system with commercially available components. His goal is to develop this system so that the ability to study seawater alkalinity can become more accessible to laboratories globally, encouraging increased acquisition of reliable alkalinity data which meets the GOA-ON data uncertainty guidelines for the parameter. In addition to his work involving total alkalinity, he is also involved in a project focused on studying boron concentration in coastal and estuarine environments.

Reconstruction of Late Quaternary Offsets Along the Southernmost Elsinore Fault Zone Using High Resolution SfM Imagery

Speaker: Faith Burkett – San Diego State University

Our study is focused on the tectonic geomorphology along the southernmost Elsinore Fault, located along the southwestern range front of the Coyote Mountains, Imperial County, California. This investigation expands on earlier work (Rockwell, 1990; Fletcher et al. 2011; and Rockwell et al. 2018) in determining surficial expression of the tectonic geomorphology in this region. In this study an Unmanned Aerial Vehicle (UAV) was deployed and collected very high-resolution imagery along the fault, to identify and resolve displacements of offset Holocene alluvial bars and channels. We identified evidence for three late Holocene surface ruptures in Alverson Canyon, and we compare our results to those interpreted from previously collected total station survey, tripod-based LiDAR survey, and field-based tape measure estimates. The average displacement of the offsets were measured with a maximum offset of $5.6\text{m} \pm 0.5\text{m}$ and a minimum offset of $4.6\text{m} \pm 0.5\text{m}$. Combined with the Rockwell (1990) estimate age of the Q4 bar at 2-3 ka, we resolved a short term slip rate of about 1.5 - 2 mm/yr, consistent with Fletcher et al. (2011) estimate for this section of the fault. The rapidly increasing technological advances of UAV surveys allow us to accurately identify the surficial expression of past surface ruptures.

Faith Burkett is a graduating senior from San Diego State University and will be receiving her Bachelors of Science in Environmental Geosciences. She plays a very active role at SDSU and is involved in three of the Geology Departments clubs; Associated Geological Students (AGS) , Associated Women in Geology (AWG), and American Association of Petroleum Geologists (AAPG). Faith also held the position of AGS president for the 2018-2019 school year. Along with her active involvement in school, she also became involved with field work, under the supervision of Dr. Rockwell. She participated in an assistant research position working with a graduate student looking at geomorphic offsets along the San Andreas Fault. Through this research she actively worked on two published papers; *Slow Slip Event On the Southern San Andreas Fault Triggered by the 2017 Mw 8.2 Chiapas (Mexico) Earthquake* and *Refining the Spatial and Temporal Signatures of Creep and Co-Seismic Slip Along the Southern 4 San Andreas Fault Using Very High Resolution SfM Imagery, Coachella Valley, California*. During her time as a field assistant, she obtained her UAV license in order to help further her own research goals. Faith will be continuing her higher education by pursuing her Masters in Geosciences, in the Fall at CSU Long Beach under the supervision of Dr. Onderdonk.

Lower Crust Development

Speaker: Sean Curran – Scripps Institution of Oceanography, UCSD

While surficial geologic processes on continents have come to be well understood, there is still uncertainty as to how the lower continental crust evolves through time. The stability of lower crustal materials is largely dependent on density and degree of hydration. At depth H₂O exists interstitially within nominally anhydrous minerals (NAMs) though partitioning is poorly constrained. We report H₂O contents in NAMs measured in situ on petrographic thin sections by secondary ion mass spectrometry (SIMS) of Proterozoic deep crustal xenoliths from Colorado, USA. In addition, we report trace element values measured in situ with laser ablation inductively coupled plasma mass spectrometry (LAICPMS). Through bulk rock H₂O and trace element reconstructions we assess the petrogenesis of the xenoliths. Reconstructed bulk rock H₂O ranges from 75 – 400 ppm; Garnet, clinopyroxene, and orthopyroxene have average H₂O contents of 85, 560, and 347 ppm, respectively. Preliminary analyses suggest the xenoliths represent cumulates fractionated from a primitive, hydrous melt at high pressures, akin to conditions in modern subduction zones and potentially associated with arc accretion that formed the craton of North America in the Precambrian.

Being born and raised in southern California Sean has always felt an affinity for the outdoors. He developed an interest in geology through surfing and hiking around Santa Barbara; then came to UC San Diego in pursuit of warmer waters and a degree. He has lived in San Diego going on 4 years and is now working towards a MS in Earth Science through Scripps Institution of Oceanography at UCSD. His research is focused on petrology and geochemistry, though he has also developed an interest in geomorphology, resource management, and ore geology. He looks forward to working as a professional geologist after obtaining an MS and hopes to find career opportunities that allow him stay in the San Diego area.

2019 SDAG EXECUTIVE COMMITTEE

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SDAG PRESIDENT'S CORNER

Hi SDAG Members,

Hope everyone is staying healthy and busy during these challenging times. Due to the pandemic and state wide stay at home orders and gathering limitations, SDAG has had to cancel the last few meetings and we will continue to do so until such measures have been lifted. So, in the meantime, we are going to try to bring SDAG meetings to the comfort of your own home by providing web-based talks. We have a Google Suite account which includes Hangouts (Google version of Zoom or Skype). This program will allow us to all tune in and watch the slide presentation and listen to the speaker on your computer. This will be the first month we try it so be please be patient with us as we iron out any bugs. I'm very excited to give this a try and am looking forward to fine tuning the procedure for future meetings. We are still planning the annual field trip to Temecula. Stay tuned for more information on that. That's about it from me. Looking forward to the web meeting!

-Adam Avakian

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AmazonSmile is an automatic way for you to support the **“San Diego Geological Society”** (SDGS) SDAG’s 501(c)(3) as your favorite public charitable organization every time you shop on Amazon at no cost to you at smile.amazon.com.

How do I select a charitable organization to support when shopping on AmazonSmile?

On your first visit to AmazonSmile smile.amazon.com, you need to select a charitable organization to receive donations from eligible purchases before you begin shopping. Please select the **San Diego Geological Society**. Amazon will remember your selection, and then every eligible purchase you make at smile.amazon.com will result in a donation to SDGS (SDAG).

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SDAG Research Tool

SDAG RESEARCH TOOL - A comprehensive listing of all papers published by SDAG, whether as annual field trip guidebooks or special publications, is now available on our website. Entries are sorted by primary author, or chronologically by date of publication, starting with our first guidebook in 1972, from Coast to Cactus in 2014, and finally on the Julian 'Road to Gold' in 2017. These can be accessed or downloaded as .pdf files. They are fully searchable in Adobe Reader or Acrobat, so if you are researching a topic, "oikocryst" for example, you can search for that keyword. This listing will be updated as new books are published. Thanks to Greg Peterson and Hargis + Associates, Inc., for making this possible. See the links below:

http://www.sandiegoeologists.org/SDAG_Pubs_authors.pdf

http://www.sandiegoeologists.org/SDAG_Pubs_chronological.pdf

Interactive Fault Map for San Diego - Tijuana

As part of the update for the San Diego-Tijuana Earthquake Planning Scenario, Working Group No. 1's "Fault Map Subcommittee" completed the first publicly available bi-national active and potentially active fault map (http://sandiego.eeri.org/?page_id=265). This interactive GIS map includes the first publicly available active and potentially fault map locations from the City of San Diego. The map also integrated the faults south of the border for a bi-national cross border view. This map is an on-going project as our knowledge increases about local active and potentially active faults.

You can expand the map legend on the left side to select layers that can be turned on or off for the map view. You can also select from 1 of 12 base maps at the base map icon. You can click on the fault line in your map layer view to see the meta-data source. In addition, the City of San Diego Seismic Safety Study Geologic Hazards & Faults Maps are available in the layer titled "GeoHaz SD City." Please note that the City "Zone 12 Potentially Active" fault layers was not included in this data, therefore you will need to use the City Maps to find Zone 12.

The Fault Map link is available at: http://www.sandiegogeologists.org/Faults_map.html

Please contact Diane Murbach (dianemurbach@gmail.com 619-865-4333), Chair for the SDTJ Earthquake Scenario Working Group #1 - Earth Science, if you have any questions, or see any errors on this new fault map.

I would like to thank Carolyn Glockhoff for her endless GIS work, Jim Quinn and the City for providing their data and time, Jerry Treiman with CGS for his time preparing the Surface Rupture and providing their new State fault data layer, and Luis Mendoza at CICESE for providing the faults south of the border. Please contact Diane Murbach (dianemurbach@gmail.com), Chair for the SD-TJ Earthquake Scenario Working Group #1 - Earth Science, if you have any questions, or see any errors on this new fault map.

Diane Murbach (619) 865-4333

Engineering Geologist, C.E.G.

www.murbachgeotech.com

Request for 2020 SDAG/SDGS Publication Sponsors

On behalf of the San Diego Geological Society, Inc. (SDGS), a public benefit 501(c)3 nonprofit educational corporation, we would like to request tax deductible Donations for our San Diego Association of Geologists (SDAG) group. The list of paid Sponsors and the forms to become a Sponsor are located on the SDAG web site at: <http://www.sandiegogeologists.org/Sponsors.html>.

Your donation will further the SDGS mission to promote geology and related fields in the greater San Diego region, operating through the San Diego Association of Geologists (SDAG), a committee of SDGS. To achieve our primary educational objective, we organize frequent field trips and maintain a program of monthly meetings featuring speakers on current geological topics. We also publish field trip guidebooks and other publications related to geology and natural history. We encourage scholarship and research by awarding scholarships from the elementary through graduate levels. With your \$100 "EMERALD" donation, your name/business will be listed as a sponsor on the SDAG web site (<http://www.sandiegogeologists.org/>) and in the monthly SDAG meeting newsletters. With your \$500 "RUBY" or \$1,000 or more "DIAMOND" level donation, your business card will also be included on the SDAG web site and in the monthly SDAG meeting newsletters. In addition, as a "\$1,000 or more DIAMOND" level donation you will be presented with a thank you plaque.

Should you have any questions regarding a Sponsorship, please contact our non-profit SDGS Secretary (Diane Murbach) at 619-865-4333.

Call for Articles

SDAG invites members to submit articles on their current research or an interesting project they are working on for publication in the monthly newsletter. The article should be no more than 1 page in length. Photos are welcomed; too. Please submit articles to the SDAG secretary via email.

Geo Job Listings

Bay West LLC is a recognized leader delivering Environmental Solutions nationwide. Now in our 44th year of service, we are continuing to grow and expand on a national platform. Bay West offers a diverse mix of expertise in the following areas; environmental consulting, engineering, emergency response, waste management and Federal contracting services.

Bay West has opened a San Diego, CA office and is seeking a mid-level **California licensed Professional Geologist** with hands-on experience supporting Federal Project Managers who enjoys a variety of responsibilities that include working in the field as well as in the office. This role is considered a career-track position to become a Federal Project Manager or Senior Technical Advisor who provides support to Project Managers.

Responsibilities:

Responsible for supporting multiple concurrent long-term projects from cradle to grave. Office administrative tasks will include supporting estimates and proposals, effectively qualifying and selecting subcontractors, supporting contracts to maintain budgets and track schedules (office and field). A significant percentage of the individual's time will be spent authoring and reviewing technical documents including Work Plans, Engineering Evaluation/Cost Analyses (EE/CA), Uniform Federal Policy Quality Assurance Project Plans (UFP-QAPPs), Technical Memoranda, Records of Decision (ROD), Remedial Investigation/Feasibility Studies (RI/FS), Proposed Plans, and periodic monitoring reports. The individual will assist the project manager with the coordination of field activities and support various projects being performed under CERCLA/RCRA on active military installations, Formerly Used Defense Sites (FUDS), and Base Realignment and Closure (BRAC) facilities. The individual may be asked to maintain and/or create project schedules using Microsoft Project or Primavera.

Requirements:

- Bachelor's degree in Engineering, Geology, Environmental Science, or a related technical field.
- Registered California PG or PE
- Minimum 5 years of project support experience; with federal environmental restoration projects under the DoD (including USACE, USAEC, AFCEC & NAVFAC and/or US-EPA).
- Thorough understanding of RCRA and CERCLA processes.
- Must have the willingness and ability to accurately interpret and apply knowledge of environmental theories, processes, and state and federal reporting requirements.
- A thorough working knowledge of Microsoft Word and Excel are required with strong data management skills.
- Outstanding technical writing and communication skills.
- Ability to present technical site summaries to the project team.
- Must foster friendly, positive, productive, and team relationships.
- Ability to read and understand maps, schematic drawings, diagrams, and instruction manuals.
- Must be willing and able to travel between 20% - 25% of the time.
- The successful candidate must be capable of receiving a US Government security clearance.
- US Citizenship Required

Preferred Requirements:

- 40 Hour HAZWOPER is preferred but not a requirement (Bay West will provide this training for candidates that currently lack it).
- 30 Hour USACE Construction Quality Management Certification
- Experience working with MS Project and Primavera
- Experience working for an environmental consulting firm.
- College coursework in organic and inorganic chemistry and contaminant fate and transport.

Compensation:

In exchange for your high performance and team participation, Bay West offers long term growth potential, competitive salary and benefits package, and bonus potential in a business casual environment.

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Liz Schmillen

Director, Human Resources

direct: 651-291-3490 · cell: 952-239-8693

lizs@baywest.com

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Brian F. Smith and Associates (BFSA) has immediate openings for several qualified individuals including Paleontological Monitors for projects in San Diego, Riverside, Orange, and San Bernardino Counties. Positions require a B.A. or M.A. in geology, paleontology, or a related field. The selected applicant(s) for the position of field monitor that holds a bachelor's degree in geological sciences can look forward to working under the responsible charge of BFSA's senior paleontologist, who is also a California Professional Geologist (PG). BFSA is the only company in San Diego County providing paleontological consulting with oversight by a California PG as part of its full-time staff, and one of the few in southern California. As a member of the BFSA monitoring staff performing professional geologic work, the selected applicant may gain time-credits for professional experience toward meeting California PG application requirements. Compensation will depend upon qualifications and ability. Please send or fax a current resume, or vita and references to resumes@bfsa-ca.com or fax to 858-679-9896.

Brian F. Smith and Associates (www.bfsa-ca.com) offers consulting services pertaining to all aspects of paleontology, archaeology, biology, history, air, traffic, noise and investigations throughout the southwest, primarily in southern California. The combined experience of the principal consultants and associates represents over 100 years of involvement in the study of the history and prehistory of this region. BFSA's capabilities are highlighted by the range of current projects, including construction monitoring, data recovery mitigation programs, historical structure assessments, surveys and evaluations for both the California Environmental Quality Act (CEQA) and Section 106 of National Historic Preservation Act (NHPA).

Project Geologist Wanted

R. T. Frankian & Associates, Inc.

R. T. Frankian & Associates, Inc., a geotechnical engineering and engineering geology consulting firm since 1963, seeks a qualified individual for Project Geologist position. This position is to work on medium to large size land development-type projects, as well as to develop work within the public sector. The successful candidate must meet the following criteria.

The Project Geologist must -

- Possess BS/BA in Geology, with classes in geologic field mapping, stratigraphy/sedimentology, and structural geology
- Have 1-3 years experience in hillside grading in L. A. County or Southern California
- Be able to perform downhole boring logging, test pit logging, field supervision, slope stability analysis
- Be able to assist CEG with various aspects of land planning and development projects, **especially** field-related aspects
- Be willing to work in various aspects of the job (field, office, and as needed inspection)
- Possess excellent written and verbal communication skills, as well as excellent interpersonal skills
- Being a PG in the State of California is preferred but not required

Senior Engineering Geologist Wanted

R. T. Frankian & Associates, Inc.

R. T. Frankian & Associates, Inc., a geotechnical engineering and engineering geology consulting firm since 1963, seeks a qualified individual for the Senior Engineering Geologist position. This position is to work on medium to large size land development-type projects, as well as to develop work within the public sector. The successful candidate must meet the following criteria.

The Senior Engineering Geologist must -

- Possess BS/BA in Geology, with classes in geologic field mapping, stratigraphy/sedimentology, and structural geology
- Have 3-5 years experience in hillside grading in L. A. County or Southern California
- Be able to perform downhole boring logging, test pit logging, field supervision, slope stability analysis
- Possess excellent written and verbal communication skills, as well as excellent interpersonal skills
- Be willing to work in various aspects of the job (field, office, and as needed inspection)
- Be a CEG in the State of California

R. T. Frankian & Associates, Inc., offers a competitive salary, commensurate with experience and abilities, and a benefits package.

Email resumes to resumes@rtfrankian.com.

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We are seeking a full-time **Senior Engineering Geologist** for our Carlsbad, CA office. Experience in geologic investigations for dams and other water infrastructure projects is a plus.

Essential Responsibilities & Duties

- Manage the technical, financial, and client relationship aspects of a variety of geologic/geotechnical engineering projects throughout the country, with a geographic emphasis in California.
- Prepare technical scopes of work and budgets for proposals, and prepare requests for proposals for subcontractor services.
- Plan and lead the implementation of geologic/geotechnical site assessments and subsurface investigations, which include: field mapping, aerial photograph interpretation, rock and soil borings, surface and downhole geophysics, LiDAR analysis, preparation of technical reports, and providing technical oversight of subcontractors including review/approval of invoices and work proposals.
- Participate actively in professional organizations and conferences; deliver presentations, and write technical papers.
- Generate new business.
- Prepare and deliver technical presentations to clients and regulators.
- This position has a field component; travel, and some overnight travel are required.

Minimum Qualifications

- B.S. in Geology; M.S. is a plus.
- P.G. and C.E.G. with registration in California.
- 10+ years of previous professional experience in engineering geology.
- Excellent technical report writing and communication skills.
- Willingness and ability to travel on short-term assignments as needed.
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- Manage and/or perform all phases of a wide variety of development/construction projects
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- Prepare and review boring and trench logs
- Perform and supervise field exploration programs, background reviews, and geological mapping
- Prepare and present proposals, scopes of work and budgets for new projects
- Interface with the client and team to proactively troubleshoot and problem-solve using practical, client-focused solutions
- Manage projects, budgets, scope, change orders and collections (from start to finish)

A strong command of regional soils and rock identification and properties, geologic hazards identification, and all applicable forms of construction observation/testing is mandatory. In addition, the qualified individual should

- Be technically competent in routine geotechnical matters and have a complete understanding of geologic factors which affect engineering design
- Have excellent communication skills (written and verbal)
- Have strong computer skills - Word, Excel, and Google Earth
- Be able to organize priorities and multi-task effectively in a team environment and play well with others
- Have a BA/BSc in Geology plus a minimum of 5 years project-level experience

Must have Professional Geologist Registration for State of California

Certified Engineering Geologist for State of California is preferred but not required

Salary commensurate with experience. Please email resumes to info@gei-sd.com

Vacancy in the Site Restoration and Agricultural Program Unit

The San Diego Water Board, part of the California Environmental Protection Agency, has an opening for a full-time Engineering Geologist position in San Diego. The position involves a wide range of geological work and projects throughout a large area of Southern California. Get your applications in now for this exciting opportunity to work with other environmental professionals to protect and restore our natural resources.

Complete applications are due February 19, 2020. Get started now and the first step is to make sure you are on the eligibility list by taking the “exam” here:

<https://www.jobs.ca.gov/CalHrPublic/Exams/Bulletin.aspx?examCD=8PB70>

All the information about the position and how to apply is here:

<https://www.calcareers.ca.gov/CalHrPublic/Jobs/JobPosting.aspx?JobControlId=189049>

SnapNHD is looking to hire an experienced geologist to review our natural hazard disclosure report and act as an ongoing advisor to the company. If you are interested in learning more, please contact will@snapnhd.com. A sample report can be found here: [Sample Report](#)



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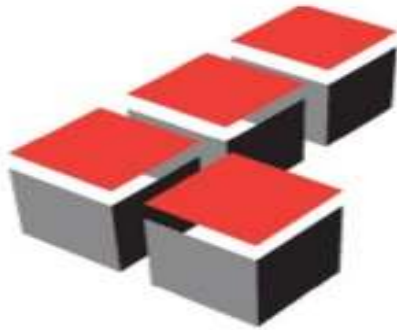


Contact: Rupert Adams, CEG

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For additional information, please contact Bob Stroh (rstroh@leightongroup.com)

Website link: <http://www.leightongroup.com>

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