



Arizona Geological Society Newsletter

OCTOBER 2018

OCTOBER 2, 2018 DINNER MEETING

Who: **Ihor A. Kunas** is the featured speaker. See abstract below.

Where: Sheraton Tucson Hotel and Suites, 5151 East Grant Road, (at the intersection of Grant and Rosemont on the North side of Grant in the **SABINO BALLROOM** (enter at northwest corner of the building) and go upstairs to the meeting room.

When: Cash Bar at 6 p.m.—Dinner at 7 p.m.—Talk at 8 p.m.

Cost: Members \$30, Guests \$33, Students Members free with online reservation (\$10 without).

RESERVATIONS ARE REQUIRED: Reserve on the AGS website (<http://www.arizonageologicalsoc.org/events>) by **11 am on Friday, September 28th**. Please indicate Regular (Sautéed Chicken Breast with Mozzarella, Tomato, Spinach, Basil and Balsamic Drizzle), Vegetarian (Roasted Vegetable Tower), or Salad (Greek Salad with Chicken) meal preference. Please cancel by **Friday, September 28th at 11 am** if you are unable to attend - no shows and late cancellations will be invoiced.

The October dinner meeting is sponsored by

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If you are interested in sponsoring a dinner meeting, please email:
vpmarketing@arizonageologicalsoc.org

ABSTRACT

The Geology and Economics of Lithium by Ihor A. Kunasz, Tru Group

Until the late 1960's, pegmatites were the sole sources of lithium concentrates and chemicals. Identified as a new element in 1845, lithium slowly found its way in numerous ce-

Continued on Page 2

ramic and chemical formulations.

Lithium occurs principally in pegmatites where various lithium minerals occur: zinnwaldite, lepidolite, amblygonite and most importantly, spodumene. There are fundamentally two types of lithium pegmatites: unzoned (the majority) and zoned. Unzoned pegmatites have practically the same mineralogical composition where spodumene makes up to 20% of the mineral suite. There the spodumene has a fairly high iron content, suitable mainly for chemical conversion. Zoned pegmatites are mineralogically complex (Bernic Lake, Greenbushes, Zimbabwe) and the spodumene is low in iron, which makes it suitable for direct use in ceramics.

In late 1960's, lithium was identified in the brines of Clayton Valley Nevada and later in the vast deposit of the Salar de Atacama, Chile. This changed dramatically the structure of the lithium industry. Today, because of the excitement of electric cars and highly optimistic projections for lithium demand, there are many on-going exploration programs by junior companies that do not fully appreciate the complexity of brines.

The paper will review the evolution of the sources of lithium production and analyze future trends.

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~ ~ Welcome New Members ~ ~

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ABOUT THE SPEAKER



Ihor A. Kunasz started his lithium career in 1970 with Foote Mineral Company, where he became chief geologist and the leading authority in the field of lithium deposits, having visited and evaluated practically all the major pegmatite and brine deposits of the world. After Cyprus Minerals Company acquired Foote Mineral Ihor became Vice President- South America for the development of gold and copper projects. After completion of his assignment, he became the Soviet Union specialist and was the initial negotiator on the first Russian gold deposit to be successfully developed by a western mining company in Russia.

Dr. Kunasz was born of Ukrainian parents in France; he is a graduate of College St. Clement. Metz, France. He has a BS in geology from Case Western Reserve University and MS and PhD degrees from the

Pennsylvania State University. His doctoral thesis was on the origin of lithium in Clayton Valley, NV, where the first brine deposit was commercially exploited for lithium. He conducted the initial exploration and evaluation programs at the Salar de Atacama, Chile and was intimately involved in the negotiations with the Chilean government.

Ihor Kunasz held various functions in the Industrial Minerals Division of Society for Mining, Metallurgy and Exploration Society (SME), and was elected President in 1998. He was honored with the prestigious AIME Hal Hardinge and the SME Dreyer awards for his outstanding contribution to the exploration, development and extraction of lithium brines.

Total Membership	Professional Members	Student Members	Organizational Members
451	334	110	7

Arizona Geological Society Membership Stats (9/25/2018)

Member Obituary: Kevin C. Horstman



Condolences to family of Kevin C. Horstman who passed away in Oro Valley on Aug. 29, 2018 owing to the effects of renal cancer. A 30+ year AGS member and 2009 President, Kevin was awarded Life Membership in 2014 for his decades of behind-the-scenes support during field trips and symposia and preparing high-quality scans of 75 digests and field guides for download on the AGS website. Kevin got his B.S. and M.S. in geology at NAU and completed his Ph.D. in geosciences at UA. His passions were planetary geology, structural geology, and remote sensing. He worked for the petroleum industry in Oklahoma (Cities Service) and as a consultant for mineral exploration and environmental geology in Arizona. His wife Cori Hoag, invites you to his celebration of life service at 11 am, Sat. Sept. 29 at Catalina United Methodist, 2700 E. Speedway Blvd in Tucson.

The Arizona Geological Society membership will vote to approve next year's slate of Executive Committee officers at the October 2nd dinner meeting. See the roster of potential officers below. Anyone unable to attend the dinner meeting may approve the officers via the SurveyMonkey link sent out via e-mail.

2019 Slate for the AGS Executive Committee

President - Sarah Baxter - U. S. Forest Service

Vice President, Programs - Karen Wenrich, Consultant and Crystals Ltd.

Vice President, Field Trips - Wolf Schuh, Freeport-McMoRan, Inc.

Vice President, Marketing - Vacant

Secretary - Leandra Marshall, Turner Laboratories, Inc.

Vice Secretary - Colin Campbell, Student, U of A

Treasurer - Mike Conway, Arizona Geological Society

Vice Treasurer - Vacant

Past President - Marisa Lerew, Asarco LLC

Councilors (2017-2019) - Dan Aiken, Freeport-McMoRan, Inc. - Retired

Ray Irwin, Consulting Geologist

Councilors (2018-2020) - William Whitty, Freeport-McMoRan, Inc.

Jennifer Isbell, Student, University of Arizona

Councilors (2019-2021) - Matthew Wetzell, Freeport-McMoRan, Inc.

Carson Richardson, Arizona Geological Survey

The Arizona Geological Society membership will also vote to approve the 2017-2018 Motions of Significance at the October 2nd dinner meeting. See the Motions of Significance listed below. Anyone unable to attend the dinner meeting may also approve the Motions via the SurveyMonkey link sent out via e-mail.

September 2017-August 2018

The following significant motions were passed by the AGS Executive Committee from September 2017 through August 2018. Each of these motions was seconded and discussed by the Executive Committee before voting.

- David Briggs moved that we appoint Bob Cummings as a counselor for the rest of this year, and next year to fill Sarah Baxter's slot. Rachel Feuerbach seconded the motion. **Motion passed.**
- Mike Conway moved that we increase dues to \$35 per year effective immediately, with no tiered dues structure. Alison Jones seconded the motion. **Motion passed.**
- Stan Evans moved to remove mention of publications on website because we do not have ability to administer sales. Alison Jones seconded the motion. **Motion passed.**
- Alison Jones moved we require advance on-line payment for dinner reservations at our monthly dinner meetings, effective January 2018. Stan Evans seconded the motion. **Motion passed.**
 - Alison Jones moved to grant permission for the AZGS to re-publish papers authored by Phil Anderson in AGS Digest 17. Dan Aiken seconded the motion. **Motion passed.**
- Dan Aiken moved change AGS By-Laws clause pertaining to 50 Year Members from "members in good standing who have maintained continuous membership for a minimum of 50 years shall have the privileges of a full member of the Society and will be excused from further payment of dues" to "members in good standing who have maintained membership for a minimum of 50 years shall have the privileges of a full member of the Society and will be excused from further payment of dues." Marisa Lerew seconded the motion. **Motion passed.**
- Motions were made for Jennifer Isbell to fill one of the vacant counselor positions and for Mike Conway to take over Treasurer position vacated by Steve Eady. **Motion passed.**
 - Marisa Lerew moved that we appoint Ray Irwin as a counselor. Dave Briggs seconded the motion. **Motion passed.**

Scientists Discover New Clues to Mount St. Helens Unusual Location

by the United States Geological Survey



The atypical location of Mount St. Helens may be due to geologic structures that control where deep magmas can rise through the crust, as suggested by new findings published today in *Nature Geoscience*. (Photo above: Mount St. Helens, 2008, after dome-building activity began in 2004. Alicia Hotovec-Ellis, USGS. Public domain.)

U.S. Geological Survey scientists Paul Bedrosian and Jared Peacock, along

with colleagues from Oregon State University and the University of Canterbury, New Zealand, used magnetotellurics, an electromagnetic geophysical technique, to create a three-dimensional image of the crust beneath southwest Washington. used magnetotellurics, an electromagnetic geophysical technique, to create a three-dimensional image of the crust beneath southwest Washington.

Volcanoes along the Cascade Arc stretch from British Columbia to northern California, formed by plate movement along the Cascadia subduction zone. Deep magmas are generated beneath the region in response to fluids squeezed out of the subducting plate. Although most of the magma surfaces beneath the Cascade Arc, the new findings suggest that inherited geologic structures, which are known to modify crustal stresses, can be an important factor in where magmas rise or stall within the brittle crust.

"Mount St. Helens is the most active volcano in the western United States, yet has long puzzled scientists as it sits far from the area where magma is thought to form," said Bedrosian. "This new data suggests that deep magmas exist over a broad area in the lower crust, including beneath St. Helens, but that an ancient suture acts as a crustal valve, allowing the sticky magmas characteristic of Mount St. Helens to ascend and ultimately erupt."

Since the cataclysmic eruption of May 1980, Mount St. Helens has alternated between periods of moderate activity and dormancy, punctuated most recently by the dome-building eruption from 2004 to 2008.

"This innovative study illustrates the important role of crustal structure and architecture in controlling the ascent of magma from deep storage regions," said John Pallister, geologist with the USGS Cascades Volcano Observatory. "Imaging these crustal features in the subsurface is fundamental to understanding the "where" and the "how" of volcanism. This study helps us understand why Mount St. Helens is the most active and explosive volcano in the Cascades."

"Magma is an opportunist, exploiting crustal flaws on its way to the surface. Mapping the crustal architecture in other areas may shed light on volcanic systems that don't fit within the standard model," said Bedrosian.

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Read the original USGS article here:

<https://www.usgs.gov/news/scientists-discover-new-clues-mount-st-helens-unusual-location>

The Nature Geoscience journal article is located here:

<https://www.nature.com/articles/s41561-018-0217-2>

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Freeport-McMoRan sponsored student dinners for the 2018 AGS monthly meetings.



AGS MEMBERSHIP APPLICATION OR RENEWAL FORM

YOU CAN RENEW OR SIGN UP as a new member and pay online. Please go to our website, arizonageologicalsociety.org. Or use the form below if you are more comfortable with the old school approach.

Please mail check with membership form to: Arizona Geological Society, PO Box 40952, Tucson, AZ 85717

Dues (check box) 1 year: \$35; full-time student (membership is free)

NEW MEMBER or RENEWAL? (circle one) Date of submittal _____

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If registered geologist/engineer, indicate registration number and State: _____

Enclosed is a _____ tax-deductible contribution to the J. Harold Courtright or the M. Lee Allison Scholarship Funds.