

SAN JUAN MINING AND RECLAMATION CONFERENCE 2021

SEPTEMBER
22-24TH



SAN JUAN
MINING &
RECLAMATION
CONFERENCE



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San Juan Mining & Reclamation Conference

Telluride • September 22-24, 2021

Welcome!

To the 11th Annual San Juan Mining & Reclamation Conference

The staff and volunteers of the San Miguel Watershed Coalition, Mountain Studies Institute, Headwaters Alliance, and Uncompahgre Watershed Partnership welcome you to thought-provoking discussions about protecting and restoring water quality at mining sites. Pandora's Box: The application of the arts and humanities to the challenges of mining and reclamation is all the more relevant as we creatively cope with the changing situation of COVID-19.

We have embraced the challenge of bringing together people and projects from the arts community with people and projects in the mining industry. We are proud to present the open-minded collaborators who offered to meld and fuse their expertise, artistic talents, venues, and other contributions that will make this event one of a kind and produce long-lasting ideas and memories. We are excited to present the 2021 conference, parties, field trips, and a few last-minute surprises!

We would like to thank our partners for special tours and events that made this conference the deep exchange of experience that it is known for: Telluride Arts District, Deep Creek Experimental, Silver Belle Mine, Matterhorn Mine, Idarado Mine and Mill, Town of Telluride, Environmental Protection Agency, U.S. Forest Service, Telluride Open Space Commission, and Colorado Department of Reclamation, Mining, and Safety.

We would like to especially thank the artists that made this year truly memorable for transforming this conference with your artistic vision: Deep Creek Mine: Laurie Lundquist, Artist/Owner, Public Art; Dan Collins, Artist/Owner, Education; Anton Viditz-Ward, Industrial Arts; Scott Harris, Industrial Arts; and Studio Chromasonic: (Johannes Girardoni and Heidi Girardoni will be on site) Light and Sound. Silver Bell Mine: MD, Artist/Owner, Painter; Brooke Einbender, Sculpture, VR; Sarah Lewicki, Sculpture; Chris Purdy, LED Acrobatics. Camp V: Robert Hoehn, Sculpture. Transfer Warehouse: Hottea: Eric Reiger, Sculpture; Flair Robinson, Sculpture; Katy Parnello, Neon, Sculpture; Robert Hoehn, Sculpture; and Tyler Simmons, Music.

COVID for SJMRC 2021

Together, we can keep each other safe and share a powerful conference experience. To keep you safe, the conference has adopted the recommendations of San Miguel County, CDC, and local establishments. All attendees are required to wear a mask while indoors, whether vaccinated or unvaccinated. Face shields may be worn as an additional layer of protection but are not a replacement for masks. Buffs, neck gaiters, and bandanas are not permitted as masks. Masks may be removed to eat or drink. Please observe the physical distancing of six feet from others as often as possible.



Planning Committee



Mountain Studies Institute (MSI) is a nonprofit, non-advocacy, mountain research and education center established in 2002 in Silverton, Colorado in the heart of the San Juan Mountains. Our mission is to empower communities, managers, and

scientists to innovate solutions through mountain research, education, and practice. MSI identifies and articulates information needs, facilitates and completes research and restoration initiatives, and ensures that pertinent scientific information is made available to decision makers and the public.

mountainstudies.org



The Uncompahgre Watershed Partnership (UWP) was founded in 2007 by a coalition of partners dedicated to understanding, restoring and protecting land and natural resources within the Upper Uncompahgre Watershed. The UWP helps protect the natural, scenic and economic values of the Upper Uncompahgre River Watershed. UWP works to inform and engage all stakeholders to promote collaborative restoration. We strive for a healthy river in a thriving community.

uncompahgrewatershed.org



The San Miguel Watershed Coalition (SMWC) was formed in 1998 to enable a collaborative forum for all stakeholders to discuss and influence the future of the watershed. SMWC's purpose is to give the communities and stakeholders in the watershed a voice to direct the future management of watershed resources. Its mission is to advance the ecological health and promote the economic vitality of the watershed through the collaborative efforts of the entire community. sanmiguelwatershed.org

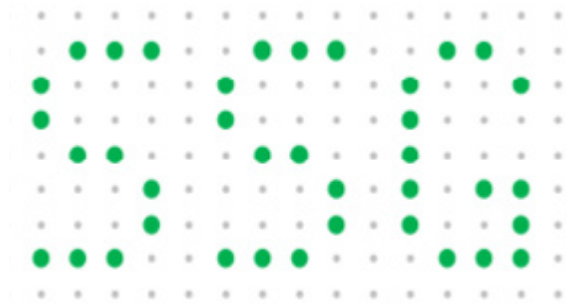


Planning Committee



Headwaters Alliance (HWA) has deep roots in the Creede community. HWA was founded in 2016 to support and continue the incredible work accomplished by the Willow Creek Reclamation Committee. HWA builds upon the legacy of this group of determined citizens who laid the foundation and loves its mining history. HWA honors this steward-

ship by seeking the pathways and projects that enable us to serve you – the water, mountains and community at the headwaters of the Rio Grande. headwatersalliance.com



Solid Solution Geosciences is a small firm headquartered in Western Colorado that specializes in water-quality sampling, water treatment, compliance reporting (such as discharge monitoring reports), geochemical modeling, NEPA baseline studies, mine permitting, and water discharge permitting. Contact Briana at briana@solidsolutiongeosciences.com to discuss your compliance and permitting needs.



Telluride Arts is a 501(c)3 non-profit organization that was established on November 17, 1971. The organization was the first non-profit in the region, and served to incubate a culture of the arts that has come to define Telluride.

Over the years our mission has remained virtually unchanged, and our holistic ethos steadfast. Our unique concern is to elevate and promote a culture of the arts in the Telluride Arts District, comprised by numerous institutions, activities, and events that engage extraordinary artists from around the region and across the globe. telluridearts.org/



Agenda

Wednesday, September 22

Peaks Resort & Spa, View Deck, Mountain Village

5:00 PM

OPENING RECEPTION

Includes heavy appetizers and two drink tickets

5:45 PM

WELCOME & OPEN MIC WITH ALEX HANDLOFF, ART GOODTIMES & SAMANTHA TISDALE WRIGHT

7:00 PM

DINNER ON THE TOWN

Many restaurants are open in Mountain Village and Telluride. Reservations are recommended due to limited hours.

Thursday, September 23

Sheridan Opera House, Telluride

8:30 AM

ADRIAN BERGERE, TODD BROWN - SAN MIGUEL WATERSHED COALITION

Welcome & Introductions

8:40 AM

KEYNOTE SPEAKER: KATE JONES

Telluride Arts District: Culture Claims – The Arts and Historic Mining Properties on the Western Slope

Session 2: Art & Design

9:20 AM

ALEX HANDLOFF - HEADWATERS ALLIANCE

Introductions

9:30 AM

KATIE WALTON-DAY

Casting a Broader Net—Using Art to Communicate Environmental Effects of Mining

9:55 AM

BOB HEDIN

Form Follows Function: Lessons from Passive Mine Water Treatment Systems

10:20 AM

BREAK

Thursday, September 23

Sheridan Opera House, Telluride



10:50 AM

MARCIE BIDWELL, MSI & JULIE PENNER, TELLURIDE VENTURE NETWORK

Future of Mining Solutions Demo Event & Lightning Talks

- PHOENIX TAILINGS
- COPPERSTONE TECHNOLOGIES
- INTERSPHERE
- AVIVID

11:35 AM

LUNCH ON THE TOWN

Telluride Arts invites you to bring your lunch to Transfer Warehouse to relax

Session 3: Engaging Communities

1:30 PM

TANYA ISHIKAWA, UNCOMPAGHRE WATERSHED COALITION

Introductions

1:40 PM

ANN MAEST, BOB PRUCHA, & CAMERON WOBUS

A Collaborative Watershed Management Vision for Mining Country: The Pebble Project story

2:05 PM

TODD JESSE

The Revenue-Virginus Mine: Revitalizing Ouray's Mining Heritage through Public Engagement

2:30 PM

MELISSA CHALONA & DEVON HORNTVEDT

Public and Private Collaboration Brings Idarado Houses Back From The Cliff

2:55 PM

BREAK

Dining in Telluride + Mountain Village

Mountain Village food: townofmountainvillage.com/explore/food-drink/

Telluride food: • telluride.com/play/dining-nightlife/
• telluridediningguide.com/complete-list-of-area-restaurants

Thursday, September 23

Sheridan Opera House, Telluride



Session 4: Looking for Keys

- 3:20 PM **BRIANA GREER, SOLID SOLUTIONS GEOSCIENCE**
Introduction
- 3:30 PM **MICHELE MAHONEY & MATT HARWELL**
Ecosystem Services – Benefits and Considerations for the Cleanup of Contaminated Mine Sites.
- 4:00 PM **TANYA PETACH & ROB RUNKEL**
Effects of Hydrologic Variability and Remedial Actions on Metal Loading near Silverton, Colorado
- 4:20 PM **LIGHTNING PRESENTATION ROUND**
Lightning Talks
- **KARL YOST**
Treatment Possibilities: Rare-Earth Metal Recovery; Hydropower; Structure Reuse; Water for Drought
 - **JEREMY SCOTT COLLARD & JOSEPH P. LAURINO**
Application of Innovative Approach to Passive Water Treatment at Abandoned Mine Lands
 - **JIM GUSEK**
ProofPassive™ – A New Passive Treatment Assessment Tool for NGOs
- 4:55 PM **CLOSING**

Pandora's Party: Transfer Warehouse in Telluride

- 5:00 PM **DOORS & BAR OPENS**
- 6:00 PM **WELCOME & MUSIC BY TYLER SIMMONS**
- 7:30 PM **GOOD NIGHT ON THE TOWN**

FEATURING ART BY FLAIR ROBINSON, ROBERT HOEHN, AND HOTTEA

Friday, September 24

Field Tours, Telluride & Ophir



9:00 AM	MORNING FIELD TOUR REGISTRATION
9:15 AM	FIELD TOUR DEPARTURE
11:45 AM	LUNCH BREAK, AFTERNOON REGISTRATION
1:30 PM	AFTERNOON FIELD TOUR DEPARTURE
3:30 PM	FIELD TOURS END
4:00 PM	SILVER BELL GRAND FINALE EXHIBITION & BBQ

Safe Travels Home & See You Next Year!

Deep Creek Experimental, Deep Creek Mine- Free Open House for All

Friday, September 25th 11:00- 1:00

[Deep Creek Experimental](#) is an artist-mine collaboration that is repurposing an old mine quarry for redevelopment as an artist cooperative and light industrial creation space. Deep within one of the tunnels, artist Johannes Girardoni has created [Chromasonic - Fluid State](#) as a site-specific light and sound installation by Chromasonic, a studio and research lab founded by Johannes Girardoni Studio with sound artists and musicians Orpheo McCord and Joel Shearer. Chromasonic explores fundamental relationships between light and sound. Created for Deep Creek Mine, Telluride, CO, the 60-foot long installation is situated in the mine's longest shaft, a pitch-black space the length of a football field. In the heart of the mountain, Chromasonic - Fluid State is the site's only source of light.

This stop on the tours is open to all conference participants (no charge) as a lunch stop and open house. Bring a sack lunch and your water bottle to enjoy this unique mine-art collaboration.

Feel free to bring your friends, family, and significant others, but kindly leave your dogs safely behind. At the mine, cats are kings. Dress warmly, wear your masks, and plan to take turns walking through the tunnels. You will probably want to spend about 20 minutes in the mine.

Recommendations: Please bring your hard hat, and headlamp or a flashlight if you have one!

Directions: The mine is about 8 miles from Telluride. Head West on Highway 145 and take a right on Deep Creek Road. Follow the road past the houses, and look for the sign to park at the bottom along the road. From there, walk up the driveway to the mine. Please wear sturdy shoes and warm clothes. It will take about 10 minutes each way to walk. If you need a ride up the driveway, please let a SJMRC committee member know in advance. Cell service is spotty.



Field Trips

Tips for Field Trips

- Please dress in layers and be prepared for cold, wet and windy weather.
- Wear appropriate walking shoes - only fully enclosed shoes are allowed (no sandals).
- Full-length pants and long sleeves are required - no shorts are allowed.
- Eye protection in the form of glasses or clear eye shields are recommended.
- Ability to walk over uneven ground, up steps, and over obstacles is required.
- Helmets will be provided at the site.
- 6' physical distancing is required outdoors and masks are required indoors.
- Bring plenty of water and sunscreen and/or sun hat. The high elevation can dehydrate you quickly, especially if you are coming in from sea level.

The elevation will vary as will the temperatures and the driving/walking surfaces will be rocky.

Ophir Tour Loop

Meeting at the Park & Ride Lot near Society Turn Conoco Station

[130 Society Dr, Telluride, CO 81435](https://www.google.com/maps/place/130+Society+Dr,+Telluride,+CO+81435)

The Ophir Area Field Trips will visit the Carribeau mine site and the Matterhorn Mill site. The Carribeau mill and adit site at the entrance to Ophir was reclaimed by the Forest Service, EPA, conservation groups and landowners from the early 2000s to 2019 to improve water quality in the Howards Fork of the San Miguel River. Joni Sandoval of the EPA will describe how the project was implemented including rerouting drainage from the adit around the tailings, and removal of approximately 150,000 cubic yards of tailings and over 14,000 cubic yards of rock waste.

At the Matterhorn Mill, a few miles southwest on Highway 145 from Ophir, a project stabilized the mill building, improving its structural integrity and is in the process of remediating the mining waste and tailings piles. Camille Price who was formerly with the Colorado Department of Public Health and Environment and Jeff Litteral of the Colorado Division of Reclamation, Mining and Safety will explain how the the U.S. Forest Service and San Miguel County are collaborating on this historic preservation of the mill and adjacent property to sustain the site for public enjoyment and education.





Pandora Mill

Meeting Location - Pandora Mill Yard

DIRECTIONS: From downtown Telluride, drive east on Colorado Ave/HWY 145 spur. Continue straight until you see the Pandora Mill Yard. Drive past it and please park at the Public Parking and Trailhead. The tour will meet in front of the Mill.

We will enter the Idarado Mine through the Mill Level Tunnel entrance to visit a newly completed flow-control bulkhead constructed to manage flows from the mine. The structure is designed to serve as a regulator valve to manage fluctuations in flow which can change daily. Devon Horntvedt, Newmont's Director of Colorado Legacy Site Management, will lead the tour. It is expected to take 30-45 minutes.

Valley Floor

Meet at [Lawson Hill Park and Ride](#)

DIRECTIONS: From downtown Telluride, drive west on Colorado Ave/HWY 145 spur. Continue straight until the traffic circle and drive south on HWY 145. Turn right at Society Turn Conoco station. Drive past it and please park at the Public and Ride. The tour will meet in parking lot.

The Valley Floor tour will examine the 2020 ST 1 Project to realign the San Miguel River away from historic Idarado tailings and cap the tailings. The realignment of the river also ensured the tailings are no longer in the San Miguel's floodplain. Conference attendees will park in Lawson Hill Park and Ride and take the Galloping Goose trail (across from the Conoco) under HWY 145 to the Valley Floor where they will meet their tour guides and representatives from SJMRC. The project was completed by ERC and the tour is being led by Lance McDonald, Town of Telluride Program Director.

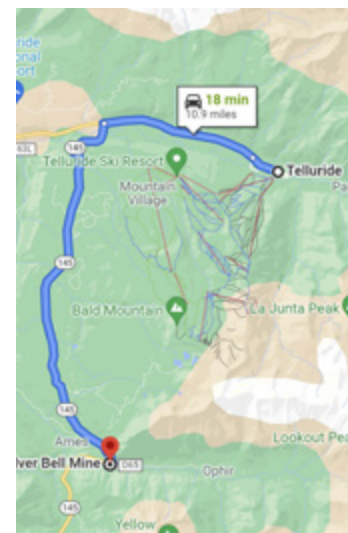
Silver Bell Grande Finale & BBQ

Silver Bell Mine, Ophir Loop, [Silver Bell Mine, HWY 145](#)

DIRECTIONS: Head south on 145 to Ophir Road. Turn Left onto Ophir Road.

The Silver Bell Mine, located just outside Ophir, Colorado, is a historic mill and assay office purchased by MD, Famous Artist. Together with agencies and partners, they have cleaned up and transformed the mine into a gallery and show space for the public to enjoy legacy mining history and modern creativity. MD invites conference attendees to attend the Silver Bell Tour, Art Show, and Conference Grand Finale intimate event to tour the facility and witness the lavish artworks of two artists on site. The two artists are [MD](#) and [Brooke Einbender](#). A complimentary BBQ for those who can attend the tour and show after Friday's tours.

[Please RSVP](#) to save your spot at this unique venue that embodies the intersection of legacy mining, reclamation, and the arts.



Meet the Speakers



Kate Jones

Kate moved to Telluride, CO in 2010 to become the Executive Director of The Telluride Council for the Arts and Humanities, a Local Arts Council established in 1971. Prior to moving to Telluride, CO, Kate was the director of a Local Arts Council in rural Washington State, Methow Arts. Since moving to Telluride, Kate has worked to re-activate the Telluride Council for the Arts leadership capacity. She spearheaded a three-year strategic plan to reposition the organization which included a name change to Telluride Arts. In 2012 she led the development of the Telluride Arts District which won recognition from Colorado as one of the first Certified Creative Districts in the state. Under Kate's leadership, Telluride Arts developed the Telluride Cultural Master Plan through community visioning sessions, which was adopted by the Town of Telluride in 2012.

TELLURIDE ARTS DISTRICT: CULTURE CLAIMS – THE ARTS AND HISTORIC MINING PROPERTIES ON THE WESTERN SLOPE

Since 1971, Telluride Arts has remained virtually unchanged, and our holistic ethos steadfast. Our unique focus is to advance a culture of the arts in the Telluride Arts District, comprised of numerous institutions, activities, and events, which engage artists from around the region and across the globe. The organization was the first non-profit in the region, and served to incubate a culture of the arts that has come to define Telluride. However, Telluride Arts is far from a solo act! Kate will take us on a tour of the vibrant collaborations and creative ventures that has fused the history and future of mining, creativity, and community. Kate will share the stage with artists, organizers and mine owners for a truly unique vision that is uniquely Telluride. Kate will take the SJMRC on a vivid journey has been incubating local arts programs, mine workings, and creative projects that define contemporary Telluride, including: the restoration of the Telluride Transfer Warehouse that will become a center for the arts at the heart of Telluride; the development of Deep Creek Experimental partnership with Studio Chromasonic; repurpose of Camp V; and the multiple dimensions of the Silver Bell Mine, outside of Ophir.



Meet the Speakers



Katie Walton-Day

Katie Walton-Day is a Research Hydrologist for the U.S. Geological Survey in Denver, Colorado. Her primary research area is hydrologic and geochemical processes affecting metal mobility in wetlands, streams, soils, and groundwater affected by acid mine drainage and mining processes. Her research involves applying reactive transport and geochemical models, stable isotope analysis, and various geochemical analytical techniques to understand metal mobility in the environment. Recently she has been working with a team to develop communication products to increase the appeal, understanding, and impact of scientific studies of the environmental effects of mining. She has worked with the U.S. Geological Survey since 1984.

CASTING A BROADER NET—USING ART TO COMMUNICATE ENVIRONMENTAL EFFECTS OF MINING

Stakeholders for scientific studies of the environmental effects of uranium mining in the Grand Canyon region include the general public, non-governmental organizations, scientists, Native American tribes, state and federal resource managers, and elected officials. It is a challenge to effectively communicate science to this broad audience and for the work to be understood and considered in resource-management decisions. Herein, we present two novel visual-art-based products designed to enhance science communication beyond what is achievable using conventional outlets such as press releases, fact sheets, or public presentations - two examples of how art and non-conventional media might increase the appeal and understanding of scientific studies. This area is primed for growth and innovation.



Bob Hedin

Bob Hedin has operated Hedin Environmental, a small professional firm specializing in passive mine water treatment, since 1994. The company has designed 60 installed passive treatment systems mainly in the Pennsylvania coal fields, but also at a Superfund site in Vermont and active mine tailings facilities around the world. The company emphasizes innovative technologies and has been a leader in the development of effective passive treatment techniques. The company recently received an EPA Small Business

Innovation Research award to develop a technology that uses carbonation to enhance calcite dissolution in mine water treatment.

FORM FOLLOWS FUNCTION: LESSONS FROM PASSIVE MINE WATER TREATMENT SYSTEMS

Effective mine water treatment opens opportunities for benefits beyond those associated with clean water. Passive treatment systems produce diverse ecological values and opportunities for innovative designs that emphasize public interaction. The success of these innovative systems depends on the functionality of the treatment. Once sustainable functionality is assured, secondary ecological, educational, and artistic benefits are possible. This presentation will describe two passive mine water treatment systems in western Pennsylvania that are fully functional and have become public assets.



Meet the Speakers



Ann Maest

Ann Maest is an aqueous geochemist and environmental consultant in Telluride, Colorado. She has evaluated water quality predictions and the environmental effects of metal mines, especially in the US and Latin America, and taught workshops on these topics to government agencies and communities around the world. Dr. Maest holds a PhD from Princeton in geochemistry and water resources.



Bob Prucha

Dr. Bob Prucha is a water resources engineer/hydrogeologist who focuses on characterization, conceptualization, numerical analysis, and contaminant transport in 'integrated' hydrologic systems. Dr. Prucha studied heat/mass flow in a geothermal system (MS, UC Berkeley) and developed a conceptual/numerical framework for studying coupled surface subsurface flow-recharge dynamics in large arid/semi-arid watersheds. He is at CU Boulder.



Cameron Wobus

Dr. Cameron Wobus is a broadly trained Earth scientist with expertise in geomorphology, surface and groundwater hydrology, and numerical modeling. He has supported agency and nongovernmental clients on climate change analyses, environmental impacts of mining, and environmental assessments, including potential impacts of mining near Bristle Bay, AK. He holds an MS in hydrogeology (Dartmouth) and PhD in Earth Sciences (MIT).

A COLLABORATIVE WATERSHED MANAGEMENT VISION FOR MINING COUNTRY: THE PEBBLE PROJECT STORY

The Pebble Project is a world-class copper/gold deposit in the headwaters of the massive, pristine Bristol Bay Watershed (BBW) ecosystem, which is critical to Alaska's Salmon industry. The proposed mine has been alternately opposed and promoted by the past two administrations and has pitted international mining companies against each other. The Project has had unparalleled involvement by government (federal, state, local, and tribal), nonprofit organizations, and for-profit entities that funded many experts in hydrology, fisheries, geochemistry, and economics to evaluate potential mining/post-mining effects on the local hydrology, water quality, and salmon populations. With the Pebble Project on hold due to key permits being denied, a new focus, funded and designed by an equally diverse set of actors, aims to understand the fundamental hydrologic behavior of and controls on the entire (regional-scale) BBW using a fully distributed and dynamically coupled groundwater-surface water model. The effort will allow communities and stakeholders to rigorously examine how individual or cumulative effects of mining and hydropower, climate change, and other stressors could affect the the entire BBW system- this project serves as an innovative example for abandoned mines.

Meet the Speakers



Todd Jesse

Todd Jesse is the Environmental Specialist at Ouray Silver Mines, Inc. Todd is a 4th generation Coloradoan who was raised in the Denver-Boulder area. After obtaining a degree in geology from the University of Colorado, Boulder, Todd joined the Peace Corps and was sent to work in Peruvian national parks. Upon his return to the US, Todd began a career as a ranger in the US National Park Service where he was paid in sunsets and had the opportunity to live in some of the most beautiful landscapes in the West. Todd

has a Masters of Environmental Management. Todd is inspired by ideas that challenge the concept of sustainability and motivated him to join the mining industry.

THE REVENUE-VIRGINIUS MINE: REVITALIZING OURAY'S MINING HERITAGE THROUGH PUBLIC ENGAGEMENT

The culture in the San Juan Mountains has significantly changed since the heyday of mining a hundred years ago. There is now a vibrant environmental community that revels in the natural beauty of the range. The environmental community is closely tied to the outdoor recreation industry that relies on the natural resources in the region to attract business. This talk tells the story of a partnership of Ouray Silver Mines partnering with local communities to obtain the social license necessary to operate. Ouray Silver Mines sees itself as part of the environmental movement and is working towards providing the raw goods necessary to transition to renewable energies. The mine will be a domestic supplier of silver which is one of five critical metals for the production of renewable infrastructure, supplying local minerals and reducing the US's carbon footprint of resources. It is also heavily regulated by numerous government agencies. Ouray Silver Mines Inc has employed a collaborative approach to overcome the "not in my back yard" mentality. The collaborative approach includes complying with all regulations set forth by government agencies, engaging in reclamation projects that incrementally improve the health of watersheds while maintaining cultural resources, providing interpretive information about the mine to the public, and supporting the local outdoor recreation community through donations and projects. By becoming an active member in the environmental and outdoor recreation communities, Ouray Silver Mines is able to operate in a heavily trafficked tourist region. This approach can be summarized simply as being a good neighbor.



Meet the Speakers



Melissa Chalona

Ms. Chalona is a professional environmental engineer for Engineering Analytics. She has served as an environmental consultant for public and private ventures, including reclamation activities in Washington, Utah, Wyoming, Colorado, Florida, Texas, and Canada for 22 years. She is also Vice-Chair of the Colorado Society of Mining, Metallurgy, and Exploration (SME).



Devon Horntvedt

Mr. Horntvedt is the Director of Legacy Site Management at Newmont Corporation. He oversees Colorado Legacy Sites management in all forms, including regulatory compliance, public outreach, closure and remediation, innovation development, and business opportunities. He is an advisor for the Colorado Orphaned and Abandoned Mine Land Advisory Board. He has 15 years in environmental engineering and is a professional engineer.

PUBLIC AND PRIVATE COLLABORATE BRINGS IDARADO HOUSES BACK FROM THE CLIFF

Idarado mining personnel used The Idarado Houses at Red Mountain Overlook from 1948-1979, but they have been vacant for 40 years. Originally there had been 10 houses, but only four remain. It has been a struggle for several years for Idarado to keep trespassers from entering and vandalizing the houses, and the houses were deteriorating from exposure to the elements. But Idarado also has a long history in the community, and there was community interest in preserving them. In addition, they were a prime example of company mining in an isolated mining setting.

Saving the historic preservation of the houses would require permits, asbestos and lead mitigation, permissions, property transfers, rehabilitation, insurance, and ongoing maintenance, all of which cost time and money. That has been the crux of preserving the Pandora Mill in Telluride. But the Idarado Houses are a historic preservation success story. So how do a private mining company, regulatory agencies, and the local community collaborate for this historic mining structure's preservation? We will tell you how we did it in this presentation.



Meet the Speakers



Michele Mahoney

Michele Mahoney is a Soil Scientist working for contaminated site remediation and reuse within EPA's Superfund program. She provides support to practitioners on using soil amendments for remediation and redevelopment/reuse, ecological revitalization, ecosystem services, and urban gardening. She provides information on remediation, treatment technologies and land reuse for EPA's EcoTools and mining for CLU-IN.org.



Matt Harwell

Dr. Matt Harwell is an ecologist with the US EPA's Office of Research and Development (ORD). Matt's areas of specialization include ecosystem assessment, integration and communication of science for decision makers, adaptive management, ecosystem services, and ecosystem restoration. In his current role, Matt helps lead ORD's national research portfolio on ecosystem services science to support community, ecosystem, and contaminated site cleanup decision making.

ECOSYSTEM SERVICES – BENEFITS AND CONSIDERATIONS FOR THE CLEANUP OF CONTAMINATED MINE SITES

One way to characterize and improve the benefits of environmental cleanups is to use concepts of "ecosystem services", those benefits that nature contributes to human health and well-being. This 20-minute presentation will outline how ecosystem services can be considered in cleanup of contaminated site cleanups. This presentation will introduce ecosystem services concepts from a contaminate site cleanup perspective and discuss ongoing efforts at EPA to connect ecosystem services concepts, tools, and frameworks to different aspects of cleanups. An understanding of ecosystem services concepts can be helpful to participants looking for enhanced environmental benefits in their projects and a key component of solving future challenges related to mining waste site remediation.



Meet the Speakers



Tanya Petach

Tanya Petach is a Ph.D. student at the University of Colorado, Boulder with a keen interest in abandoned mine lands and water quality management.



Rob Runkel

Dr. Rob Runkel is a Research Hydrologist with the U.S. Geological Survey's Colorado Water Science Center. Rob has a Ph.D. in Environmental Engineering in 1993 from the University of Colorado. Rob's specializes in the use of tracer techniques, synoptic sampling, and reactive transport models to characterize the loading, fate, and transport of constituents in acid mine drained streams, hyporheic zones, and nutrient dynamics.

EFFECTS OF HYDROLOGIC VARIABILITY AND REMEDIATION ON ZINC LOADING, SILVERTON, COLORADO

Water-quality data from the Upper Animas Watershed were used to evaluate trends in metal concentrations and loads over a two-decade period. Selected study sites included Mineral Creek (M34), Cement Creek (CC48), and Upper Animas River (A68) and one aggregate site in the Animas River downstream of the headwater streams (Animas River below Silverton, A72). Data were divided into two time periods based on the timing of remedial activities in the watershed. The first period includes active treatment, surface reclamation, and bulkhead installation; the second period monitors water quality in the decade following these activities. Water quality data were used to develop annual and monthly load estimates using the Adjusted Maximum Likelihood Method and USGS streamflow data. Flow weighted loads were analyzed using a Mann-Kendall test to determine monthly changes in zinc loading through time and using t-test comparison. Zinc loads estimated for A72 indicate decreased zinc loading during the rising limb of the hydrograph in the second time period, perhaps due to a reduction of snowmelt-derived zinc load following surface reclamation activities. In contrast, baseflow zinc loading increased at A72, perhaps due to the cessation of water treatment in the headwaters of Cement Creek. Flow weighting of load estimates yielded increased statistical significance and enabled more nuanced differentiation between the effects of hydrologic variation and remediation on zinc loading.



Meet the Speakers



Karl Yost

Karl Yost directed environmental construction assets at hundreds of remediation sites in the Midwest, the Pacific Northwest, and across the country over his 40-year career. He successfully delivered “off-the-shelf” and innovative treatment technologies from concept through full-scale. Karl was inventor/co-inventor of: the MAECTITE® technology for leachable lead/radionuclides; MatCon® impermeable asphalt for environmental caps;

Advanced Neutralization™ treatment for acidity and removal of heavy metals as oxides from Acid Mine Drainage; the AMEOX™ destruction technology for PFAS in aqueous concentrates and spent activated carbon; and MBT technologies for leachable hazardous metals and PFAS sequestration in soils and other solids. His past roles have included: NPDES Compliance Auditor; USEPA Response Manager; VP Technical Services (MAECORP); Director of Treatment Services (Sevenson); Environmental Division Manager (Granite Construction); and Director of Treatment Services (WaterTectonics). He founded YB Technologies in 2019. Karl graduated from Albion College, Albion, MI and resides in the Pacific Northwest.

AMD TREATMENT POSSIBILITIES: RARE-EARTH METAL RECOVERY; HYDROPOWER; STRUCTURE REUSE; WATER FOR DROUGHT

Water shortage, acid mine drainage, demand for rare-earth metals and electricity, and preservation of historic mining structures are long-term concerns contemplated for address by coupling AN™ and MBT technologies at draining mines. AN and MBT technologies will collectively provide solutions to AMD when integrated within historic mine sites. AN system equipment: is compact for installation within mine workings or re-purposed structures; can generate hydropower; and benefits from site elevations as did former ore mills. MBT processing of AN and mining-related materials yields an end-product suitable for in-mine filling/closure to halt AMD. Data from site trials and studies show favorable performance of the technologies from numerous abandoned mines in CO, ID, and WA as data shows. Recovery feasibility of precious and rare-earth metals from AMD is suggested in scientific literature. With the AN technology and its flexible capabilities, and the current value of these metals, future research with the technology is now plausible and merited. Until results are available, implementation of the combined technologies can still mitigate AMD and close mines, generate electricity, produce water suitable for agricultural or other uses, and readily adapt to commercial rare-earth/precious metal recovery options. Mine design/operational expertise for reuse of mine sites and exploiting water and retained pressure from behind bulkheads will be critical for various sites. Supporting historic aesthetics and culture by engaging community interests and artisan creativity will further enhance economic return of the technologies, while providing a small but important response to long-term concerns to the direct benefit of the community.



Meet the Speakers



Jeremy Scott Collyard

Jeremy Scott Collyard is the U.S. Mining and Minerals Business Sector Lead, a certified Project Management Professional (PMP), and a Qualified Professional in the field of environmental permitting and compliance with over 15 years of experience working in the mining and industrial sectors. Jeremy brings an extensive background in mining, including project management for mining sites throughout the United States. His background includes mine remedial investigations and feasibility studies (RI/FS); environmental permitting, monitoring, and compliance programs; Environmental Impact Statements (EIS); environmental baseline studies; evaluation and development of water management planning; and mine closure strategy, planning, and implementation.



Joseph P. Laurino

Joseph P. Laurino, Ph.D., MBA is the founder and president of Periodic Products, Inc., located in Fort Lauderdale, Florida, and the inventor of the company's polymer technology. He currently governs the Company's scientific research and technology development. Dr. Laurino has held academic positions at the University of Tampa and Brown University, and positions at several Fortune 100 companies. He received a Ph.D. in organic chemistry from the University of Virginia, an MBA from the University of Tampa, a bachelor's degree in chemistry from Georgetown University, and has authored or co-authored over 65 scientific publications, 10 United States patents, and 36 international patents.

APPLICATION OF INNOVATIVE APPROACH TO PASSIVE WATER TREATMENT AT ABANDONED MINE LANDS

The Arizona Department of Environmental Quality (ADEQ) manages multiple Abandoned Mine Lands (AMLs) including many sites with impacts to surface water and groundwater. Of these sites is the Stormcloud Adit located near Prescott, Arizona. The Stormcloud Adit actively discharges to surface water at a rate of approximately 1-3 gallons per minute. In 2020, ADEQ and SLR teamed up to perform a bench-scale test of a new treatment technology developed by SLR and Periodic Products for the treatment of mine impacted waters. This presentation will present the treatment approach developed by SLR and Periodic Products, the results of previous testing analysis conducted, and present the Stormcloud Adit project including the challenges at the site, the water quality, discharge criteria, bench-scale testing, and results of the project. This treatment technology and approach has proven to be successful in the laboratory, including the Stormcloud Adit, and if proven in the field may be a powerful tool for the closure and remediation of AMLs contributing to groundwater and stormwater impacts throughout the United States and beyond.

Meet the Speakers



Jim Gusek

Jim Gusek graduated from the Colorado School of Mines in 1973 with a B.Sc. in Mining Engineering. He specializes in the design of passive treatment systems for mining influenced water. Since 1987, his work with acid rock drainage prevention and passive water treatment systems has included about over 100 projects throughout the U.S. and internationally. He is on the steering and mitigation committees of the Acid Drainage Technology Initiative - Metal Mining Sector (ADTI-MMS). He joined Linkan in 2019.

PROOFPASSIVE™ – A NEW PASSIVE TREATMENT ASSESSMENT TOOL FOR NGOS

Watershed groups and other non-profit organizations/NGOs wishing to implement passive treatment to restore their mining-impaired streams are often faced with a double dilemma: 1) Are passive technologies appropriate for their mining influenced water (MIW) and 2) How can they document this to secure permits and/or funding? Retaining the appropriate engineering and field work takes time and is expensive. Fortunately, a do-it-yourself test kit called ProofPassive (TM) that was introduced in 2021 can solve the dilemma. A standard kit containing 10 testing units, customized to each site's MIW, is prepared by experienced passive treatment engineers, and shipped to the buyer for simple implementation. The kits have detailed written instructions, links to instructional videos, and online/phone support. The buyer just adds their own MIW to each cell and then takes weekly field parameters with pH, conductivity, and oxidation reduction potential (ORP) probes (provided as an option) for about eight weeks. At the end, the buyer submits the water samples to a laboratory for analysis. Technical support from the engineers is available throughout the test and a written report with the test results is provided, followed by a video call discussion. The report becomes a powerful attachment for permitting and funding grants. The test kit is quick, easy, and costs a fraction of full-service engineering and field services.



Meet the Artists



Tom Livingstone

Growing up in scenic Colorado, Tom developed a keen interest in extreme outdoor adventure sports alongside photography. In 1994, Tom was accepted to the world-renowned Brooks Institute of Photography in Santa Barbara, California. After studying commercial photography, Tom was hired to join an exploration team to film and photograph the deepest cavern in the world in Mexico for the Discovery Channel. In 2011, Tom opened Kendall Mountain Gallery in Silverton, Colorado. Tom has spent the last eight years trekking and adventuring across the San Juans to capture mining structures among the majestic mountains. He is excited to share the culmination of the effort, "Historical Treasures of the San Juans." thomaslivingstone.com



Art Goodtimes

Art Goodtimes is self-described as a Green Paleohippie Rainbow Family Fungophile poet, basketweaver & social activist. He is also an accomplished American poet, farmer and politician in Colorado. Mr. Goodtimes was first elected to the San Miguel County Board of Commissioners in 1996 and was elected five times before retiring in 2016. He is a noted poet and writer of several books and the poet laureate of the Telluride Mushroom Festival. He was co-editor of the anthology *Mycopathalia: Mushroom Wedding Poems* (2016). He grew up in California and graduated from San Francisco State University in 1970.



Samantha Tisdale Wright

Samantha Tisdale Wright is a nationally recognized independent journalist and freelance writer based in Silverton, Colorado. She is the recipient of the Sigma Delta Chi Award for Breaking News from the Society of Professional Journalists for her reporting on a double-fatality at the Revenue Mine near Ouray, Colo. Samantha has won numerous awards for her writing, including the Sigma Delta Chi Award for Excellence in Journalism from the Society of Professional Journalists. Before settling into her career in journalism, she explored far-flung corners of the world ranging from the Silk Road to the Killing Fields to the crocodile-infested rivers of Queensland, Australia to Antarctica.



Tyler Simmons

Hailing from across the street, singer-songwriter, band leader, and part time environmental professional Tyler Simmons creates a musical atmosphere reminiscent of listening to a crackling record near a roaring fire. Emitting a familiar folk sound with roots dug deep in jazz, Tyler will keep your hips turning and ears tuned in.

2021 Mining Solutions Boot Camp

IN PARTNERSHIP WITH TELLURIDE VENTURE NETWORK, MOUNTAIN STUDIES INSTITUTE, & NEWMONT

[The Mining Solutions Bootcamp](#) brings together business start-ups addressing issues in the reclamation, mining, and clean water industries to participate in high-impact mentoring, strategic coaching, and networking with industry experts and investors. The partnership aims to support companies addressing all parts of reclamation, water treatment, monitoring, remote sensing and communication, and economic cost recovery through secondary products, recovery of metals, and/or repurpose of byproducts. This year's Bootcamp is a hybrid of virtual and in-person instruction and has enabled participation from companies as far away as Canada and France.



Intersphere: Offers seamless weather and climate forecasts on timescales of minutes to decades in the future.

Ben Toms ben.toms@intersphere.earth | Fort Collins, CO



GenoMines: Genetically enhance metal hyperaccumulator plants to produce bio-sourced metals and limit the environmental impact on mining groups.

Dali Rashid dali.rashid@genomines.com, Fabien Koutchekian fabien.koutchekian@genomines.com | Paris, France



Phoenix Tailings: Sustainably produced metals and raw materials recycled from mining waste. The company harvests domestic rare earths, base & precious metals, pigments, and other raw materials, all with zero direct carbon emissions.

Nick Meyers nick@phoenixtailing.com, Anthony Balladon anthony@phoenixtailings.com | Woburn, MA



Copperstone Technologies: Robotic services for hazardous site investigations, tailings geotechnical and water surveys.

Craig Milne cmilne@copperstonetech.com | Edmonton, Alberta, Canada



AVIVID is advancing water purification using patented electrocoagulation process to treat waters contaminated with emulsified oils, heavy metals, arsenic, suspended solids, and microorganisms without sludge buildup.

Tracy Kessner tracy.kessner@avidwater.com | Longmont, CO

Are you a start-up, mentor or investor and curious how you can get involved or about next year's bootcamp? Please contact Marcie Bidwell at marcie@mountainstudies.org

Join Us in 2022!

FOR MORE INFORMATION ABOUT NEXT YEAR'S CONFERENCE, PLEASE CONTACT
MARCIE BIDWELL AT MARCIE@MOUNTAINSTUDIES.ORG



Special thanks to [Headwaters Alliance](#) and Briana Greer of Solid Solutions Geosciences for special donations to support the arts in this year's program.