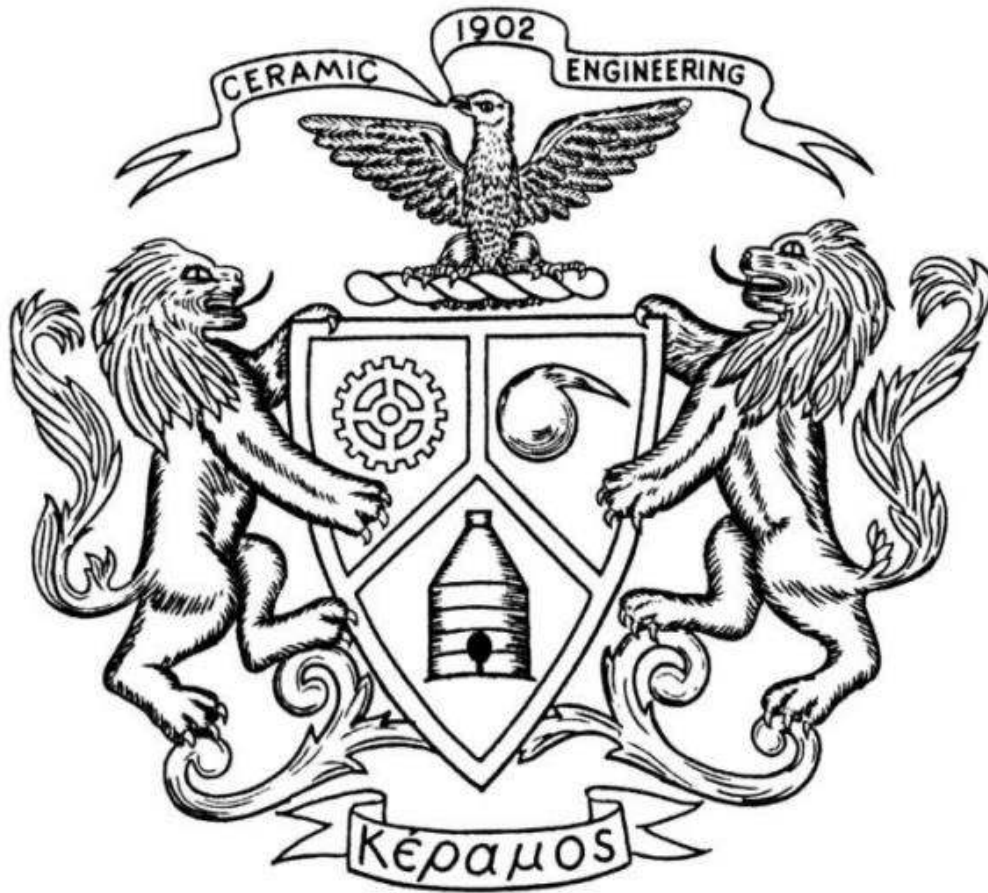


# The Colorado Chapter of Keramos



**2021-2022 Annual Report**

## **Keragram Summary Article**

The Colorado School of Mines Keramos chapter has grown in leaps and bounds, in terms of membership, activities, and perhaps most importantly, community. In the past year we have initiated 19 new members, tripling the size of the chapter, started a new tradition in hosting lunch and learns, and continued to build the community that binds this chapter.

Our greatest achievements as a chapter came in the lunch and learn lecture series and through running the glass and pottery studios. Since the start of fall semester, Keramos has hosted a lunch and learn every other week featuring a professor, industry professional, or graduate student discussing the world of ceramics and their involvement within. This has led to lectures discussing topics as diverse as the finer details of glass fracture, the inner workings of proton conducting fuel cells, or the thermal shields on Sierra Space's Dreamliner. These lectures have been cited as the best part of Keramos for the past year, combining professional development, learning, and elements of community building. In addition to the lunch and learn series, the chapter has worked to set up a pottery studio where students can regularly explore the artistic side of ceramics, and we are proud to report that the studio will be regularly usable by the entire chapter in the coming years. The CSM Glass Shop has continued to be an outstanding success, with members of Keramos enthusiastically helping run the sales and shop as teaching assistants and volunteers and combined with outreach events such as Discover and Explore Mines, Keramos and ceramic engineering are more recognized than ever. Finally, the return of social events such as Skeramos and board game nights have fostered fellowship among the members, promoting the growth of a community as strongly bonded as  $sp^3$  carbon.

While residual COVID-19 restrictions and complications with timing meant certain outreach events were scaled down or pushed off, Keramos still completed several outreach events, and plans to expand these efforts in the coming semester. Most importantly, Keramos has received permission from Mines administration to resume planning for Future Ceramists Day, a proposed outreach event demonstrating various materials science concepts generously funded by the CGIF.

This year our chapter has burst into life, and while we have experienced growing pains, we have acclimatized to new energy and new ideas. We look forward to continuing this growth as CSM reveals an entire ceramic engineering major, to sharing materials science and ceramics with engineers and scientists of all ages, and to using the fibers of community to strengthen Keramos as a whole.

*Aidan Ravnik*  
President  
2021-2022

## **Annual Plan for the Upcoming Academic Year**

Above all, Keramos hopes to continue the projects begun this year which have helped us to grow as we have. The lunch and learn lecture series will become standard events going forward, and we hope to increase the reach of these series by bringing in more and potentially further afield guest lecturers, who can talk about aspects of ceramics our members may not have considered. For example, we hope to bring in a greater proportion of industry speakers, such as Precision Cast Parts and Honeywell. Secondly, we hope to train enough users in the use of pottery that true classes and open studio times can be held, open to any Keramos members and ideally elements of the whole campus. Finally, Keramos will continue to collaborate with Materials Advantage on university outreach and social events, increasing the capacity of both organizations to provide community and development to our members. The social events which have kept Keramos together, such as Skeramos will continue to be key traditions even as Keramos grows and diversifies.

In terms of larger initiatives, Keramos aims to plan and execute Future Ceramists Day using the funding earmarked from the Ceramics and Glass Industry Foundation. Future Ceramists Day will be a major initiative, involving hundreds of students and dozens of educators in demonstrations of key materials science principles, as well as the incredible behavior of ceramics for both technical and artistic purposes. As members of Keramos it is our duty to engage the scientists and engineers of the future, and the Colorado School of Mines chapter is eager to uphold that.

A final project Keramos hopes to undertake in the coming semester is engaging more students in conferences and interchapter outreach. We are currently planning to send at least one student to the 83<sup>rd</sup> Conference on Glass Problems in Columbus, and at least four students to MS&T in Pittsburgh for convocation and the mug drop competition. Through these events we hope to bring Mines to the forefront of Keramos and provide our members with invaluable networking opportunities.

The Colorado School of Mines Keramos chapter anticipates a continuation of the growth we have experienced in both number and community, a deepening of our ties to industry and professionals, with new opportunities for social events, outreach, and learning around every corner.

*Aidan Ravnik*

President

2022-2023

## List of Officers

<b>Outgoing Officers (2021-2022)</b>				
<b>Position</b>	<b>Name</b>	<b>Email</b>	<b>Address</b>	<b>Phone</b>
President	Aidan Ravnik	[REDACTED]	[REDACTED]	[REDACTED]
Vice President	Brendan Engebretson	[REDACTED]	-	[REDACTED]
Treasurer	Gilly LeFevre	[REDACTED]	-	[REDACTED]
Secretary	Abigail Morrow	[REDACTED]	[REDACTED]	[REDACTED]
Herald	Shannon Rogers	[REDACTED]	[REDACTED]	[REDACTED]
Glass Shop Managers	Abigail Morrow	[REDACTED]	[REDACTED]	[REDACTED]
	Alexa Rennert	[REDACTED]	[REDACTED]	[REDACTED]
<b>Incoming Officers (2022-2023)</b>				
<b>Position</b>	<b>Name</b>	<b>Email</b>	<b>Address</b>	<b>Phone</b>
President	Aidan Ravnik	[REDACTED]	[REDACTED]	[REDACTED]
Vice President	Brendan Engebretson	[REDACTED]	[REDACTED]	[REDACTED]
Treasurer	Gilly LeFevre	[REDACTED]	[REDACTED]	[REDACTED]
Secretary	TBD	[REDACTED]	[REDACTED]	[REDACTED]
Herald	Shannon Rogers	[REDACTED]	[REDACTED]	[REDACTED]
Glass Shop Managers	Elizabeth Pritchett	[REDACTED]	[REDACTED]	[REDACTED]
	Alexa Rennert	[REDACTED]	[REDACTED]	[REDACTED]

## List of Active Members

Name	Email	Initiation Date
Aidan Ravnik	[REDACTED]	Spring 2021
Hayden Delius	[REDACTED]	Fall 2021
Melanie Torres	[REDACTED]	Fall 2021
Tatum David	[REDACTED]	Fall 2021
Amber Lively	[REDACTED]	Fall 2021
Daniel Moreno	[REDACTED]	Fall 2021
Gabriella Moreno	[REDACTED]	Fall 2021
Alex Hopkins	[REDACTED]	Fall 2021
Addison Wong	[REDACTED]	Spring 2018
Mitchell Lensing	[REDACTED]	Fall 2021
Brendan Engebretson	[REDACTED]	Fall 2021
Jack Dorsey	[REDACTED]	Fall 2021
Larissa Pelleteris	[REDACTED]	Fall 2021
Jessica Stanfel	[REDACTED]	Fall 2021
Lydia Hines	[REDACTED]	Fall 2021
Andrew Lesuer	[REDACTED]	Fall 2021
Caleb Schenck	[REDACTED]	Fall 2021
Abigail Morrow	[REDACTED]	Spring 2021
Alexa Rennert	[REDACTED]	Spring 2021
Shannon Rogers	[REDACTED]	April 2018

Gillian Lefevre	[REDACTED]	Spring 2021
Allison Perna	[REDACTED]	Spring 2022
Neil Stockmal	[REDACTED]	Spring 2022
Claire Vozel	[REDACTED]	Spring 2022
Sam Ware	[REDACTED]	Spring 2022

<b>Active Graduate Members</b>			
<b>Name</b>	<b>Initiation Date</b>	<b>Email</b>	<b>Phone Number</b>
Shannon Rogers	April 2018 (Alfred University)	[REDACTED]	[REDACTED]
Brian Davis	Spring 2018	[REDACTED]	
Allison Perna	Spring 2022	[REDACTED]	

<b>Active Faculty Members</b>			
<b>Name</b>	<b>Initiation Date</b>	<b>Email</b>	<b>Phone Number</b>
Sarah Harling	Fall 2021	[REDACTED]	[REDACTED]
Geoff Brennecka	Fall 1997	[REDACTED]	[REDACTED]
Brian Gorman	Fall 1993	[REDACTED]	[REDACTED]
Allison Caster	Spring 2020	[REDACTED]	[REDACTED]
Gerald Bourne	Fall 2017	[REDACTED]	[REDACTED]
Garritt Tucker	Spring 2018	[REDACTED]	[REDACTED]

### ***Spring Initiation***

Our chapter initiated 19 new members for the 2021-2022 academic year, honoring Keramos tradition even as our chapter grows larger than ever before.

# Graduating Members

Graduating Members		
Name	Graduation Date	Email
Abigail Morrow	May 2022	████████████████████
Addison Wong	Fall 2021	████████████████████

## Honorary Member

It is with great enthusiasm that the Colorado School of Mines Keramos Chapter would like to nominate Dr. Leslie Lamberson as their honorary member during the 2021-2022 school year. Dr. Lamberson's work in the eXtreme STRuctures & Materials (X-STRM) laboratory in dynamic strain rate fracture and hypervelocity impact of ceramics has led to new insights and understanding into the complex mechanical behavior of ceramics.

Dr. Lamberson attended the University of Michigan for undergraduate, with a double major in aerospace engineering and dance performance. After obtaining her bachelor's degree, Dr. Lamberson worked at Lockheed Martin as an Aeronautics Advanced Development Program engineer before leaving for graduate school. As a NASA Space Grant fellow, Dr. Lamberson went on to achieve an M.S. Georgia Tech with a thesis concerning fatigue in thin films. Working with Professor Ares Rosakis, Dr. Lamberson earned her Ph.D. from the California Institute of Technology investigating hypervelocity impact damage. While completing her postdoctoral fellowship at Johns Hopkins University in the Center for Advanced Ceramic and Metallic Systems, Dr. Lamberson was selected to work at NASA Glenn as a Faculty Fellow, which she completed in 2013. After working for 6 years at Drexel University as a faculty member, during which time she was honored as a 2017 ONR Young Investigator and a 2018 NSF CAREER awardee, Dr. Lamberson became faculty at the Colorado School of Mines and started the X-STRM lab in 2019. The X-STRM lab has since published numerous critical investigations of ceramics in extreme conditions, with papers on failure of fiberglass composites, dynamic electromechanical fracture of ferroelectric materials, and failure of MAX phases.



The Keramos Chapter at Colorado School of Mines, believes that inducting Dr. Lamberson would be a benefit to our chapter and the national organization. Her continuing work in understanding the complex mechanical behavior of ceramics has growing relevance to the materials challenges of the future, which should be recognized by both the Colorado School of Mines and Keramos at large.



## **Treasurer's Report**

Keramos' funds were organized into two accounts for the 2021-2022 academic year, the student activities account, and a hot shop account, which is utilized for purchases pertaining to both glass and pottery. The student activities account contains Keramos dues, certain fundraising sales, and club purchases. The hot shop account contains sales made outside of university fundraising events and is used for maintenance and purchases in the glass shop and pottery studio.

Dues were collected by students during initiation and deposited into the student activities. Throughout the academic year, the hot glass shop held multiple sales that were very successful, most prominently the pumpkin sale. All of the funds made through the official glass shop sales were deposited into the student activities account through SAIL as they were of fundraising nature. These funds were then used to facilitate our new series of lunch and learns, social events such as our game night, and plan initiation. Throughout the year, the glass shop required a few purchases to maintain equipment and replace broken tools, including a large purchase of a new element for the melter when it went down. Additionally, a grant has been submitted to purchase an entirely new melter, though the outcome of this is unknown. These purchases were in addition to the typical expenses of the glass shop including the purchases of clear glass, colored frit, and typical maintenance. Efforts this year to create a pottery studio on campus have led to many purchases, including clay, glazes, wheels, and other miscellaneous equipment. The pottery studio has started to hold off-campus fundraisers for their creations, which will go directly into the hot shop account, as it is not directly affiliated with the university.

## Chapter Activities

### Educational Outreach

Despite challenges encountered over the course of the year due to school and public gathering requirements, the Colorado Keramos chapter was able to continue completing outreach activities to engage and encourage future generations towards materials science and ceramic engineering.

#### *Discover & Explore Mines*

Keramos partnered with the Colorado School of Mines Materials Advantage Chapter (CSMMAC) to host booths at the in person Discover Mines and virtual Explore Mines events. At Discover Mines, hundreds of students from all over the country visited Mines to learn about the majors and clubs offered. Keramos represented ceramics and materials at Mines through a table where Keramos members discussed their work in the glass shop, pottery, and undergraduate research. Members additionally demonstrated engineered ceramic properties with piezoelectric pellets and a ZTA armor plate. The virtual event Explore Mines had similar discussions, but material properties were demonstrated by showing the students videos of glassblowing, and a video created last year in collaboration with the Lamberson group explaining Prince Rupert's drops. The video can be seen here: <https://youtu.be/qBApHbSVUEk>.

#### *JFK High School Materials Experiments*

This fall Keramos worked with the Colorado School of Mines Materials Advantage Chapter (CSMMAC) to demonstrate materials science concepts through a series of experiments and talk about careers in STEM at JFK High School in Denver. The motivation of this event was to answer questions about materials science and build engagement for local high school students interested in materials science and engineering. The session saw the discussion of what classes to take for STEM preparation, why materials science is valuable, and what properties caused the effects seen in demonstration, such as piezoelectric and thermoelectric behavior.

### Professional Development

#### *Lunch and Learns*

This year Keramos began offering bi-weekly lunch and learn lecture sessions on various topics relevant to ceramics. These lunch and learns included talks from professors, graduate students, and industry professionals. The lectures were typically technical in nature, with diverse topics including finite element analysis of glass, fracture of piezoelectrics under high strain rates, and the history and future of solar cell technology. These lectures were intended to



expose students to the extreme variety of work present in ceramic engineering, and to connect students with potential employers and research opportunities. Additionally, these talks were designed to give undergraduates an idea of what it is like working in the field of ceramics, as well as insight as to what graduate school is like. Especially at a metallurgy focused school like the Colorado School of Mines, it can be tough to find ceramics opportunities and experience the breadth of the ceramics world, which the lunch and learn series helped students overcome.

### ***Resume Review Session***

The Colorado School of Mines career fair allows students to connect with representatives from many top companies in industry. This connection can often lead to internships and full-time employment if the student makes a good impression on the representative. To help members put their best foot forward at career day, Keramos hosted a resume review session. Members brought their resumes and exchanged them, offering each other constructive tips. Additionally, a representative from the career center pre-printed badges and offered professional advice. Finally, members with previous internships worked as a panel to answer questions about their internship experiences.

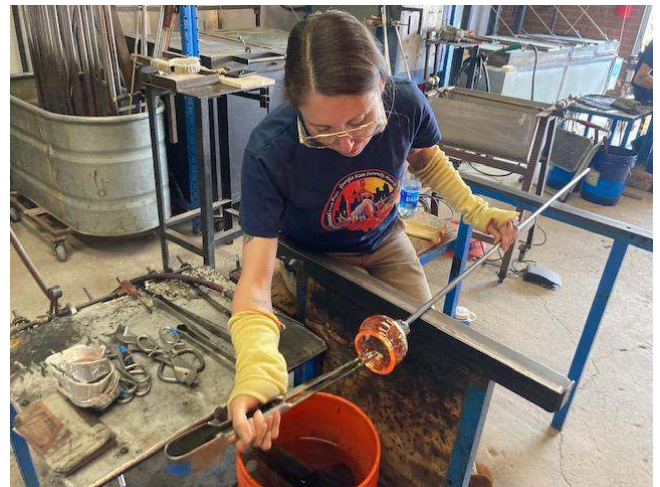
### **Service to Ceramics Community**

#### ***Glass Shop Management***

The glass shop has been successful under the management of Abigail and Alexa, with no major safety issues and only one maintenance issue.

Replacement managers have been selected to replace Abigail as she graduates and will finish their trial period the coming semester.

Despite certain technical difficulties with the melter, the glass shop has successfully completed its fifth year of operations. Both the fall and spring semesters saw completely full registration for the Art & Science of Glassblowing class, with slots chosen by lottery. Open shop times have been maintained as a key element of the glassblowing program, even as the founders of the shop graduate from Mines. There has been increasing outreach to local artists, with several glassworkers coming and giving demonstrations at Mines to the class. Additionally, Mines students were able to work at the professional glassworks The Furnace while the melter was down, establishing a relationship we hope to continue with the coming year. Many of these opportunities and other work in the shop were featured on the glass shop instagram, [@happylittleglassshop](#). Overall, glassblowing at Mines is more popular and successful than ever.



### ***Soda Lime Saturdays***

Soda Lime Saturdays (SLS) have continued into the coming year, and have seen particular popularity with outreach events such as friends and family weekend. Sign up slots are consistently and completely filled, even when many SLS's are restricted to particular groups such as the Society of Women in Engineering (SWE) and the Colorado School of Mines Material Advantage Chapter (CSMMAC). Although the technical issues with the melter limited the number of SLS's which could be held in the spring semester, there will be a resumption in normal SLS's in the fall.

### ***Glass Shop Sales***

This year the glass shop held two major sales, including the flagship pumpkin sale in the fall semester, and a more general 'Garage Sale' in the spring. Additionally, the Mines Greenhouse commissioned a series of bell vases for use as lighting fixtures. The pumpkin sale featured over 50 custom ordered pumpkins, while the garage sale sold a variety of paperweights, flowers, birds, and vases, among others. The fundraising and outreach provided by these sales have continued to raise Keramos' profile on campus.

### ***Pottery Studio***

Over these past two semesters Keramos has opened a pottery studio for members to play with clay and combine the artistic and technical aspects of ceramics. While supply chain issues have limited the amount of open studio time Keramos can offer, recent months have seen clay arriving and students creating a variety of art for personal enjoyment and fundraising. Additionally, students are investigating the creation of engineered clay mixes such as ZTA for submittal to the mug drop competition next semester.



### ***Alumni Engagement***

Several Keramos alumni currently attend the Colorado School of Mines for graduate school and work as professors. As the Colorado chapter of Keramos alumni network continues to grow, Keramos has reached out to these alumni to speak at Lunch and Learns, and hopes to continue this in the future, especially as alumni become more able to provide professional opportunities through internships.

## **Participation at Annual Convocation and Business Meeting**

Our president and vice president both attended the annual convocation and business meeting in Columbus at the MS&T conference. This allowed the chapter the opportunity to formally meet with other chapters in attendance to discuss bylaws, updates from each chapter, and other orders of business. At this meeting, our president was elected as the National Student Representative for Keramos. Later in the conference, Keramos submitted two mugs to the mug drop competition, where Mitchell Lensing's mug won second place in the aesthetic mug category. Keramos looks forwards to attending next semester's meeting in Pittsburgh.

## **Interchapter Communications and Collaboration**

### ***Monthly Phone Calls***

On a monthly basis, the presidents of each Keramos chapter met over Zoom to share chapter updates and deal with varying orders of business. These calls provided valuable advice on retaining members, ideas for outreach events, and ways to incentivize students to run for office.

## **Social Events**

### ***Skeramos***

Continuing a long tradition of enthusiastic Halloween celebrations and puns, Keramos hosted Skeramos as a way for our members to have some spooky fun and destress from midterms. Members brought potluck foods and desserts, showed off their costumes in a costume contest, played card games, and watched *The Nightmare Before Christmas*. This event was invaluable to building community among the 15 people who joined Keramos that semester and provided much needed relaxation to every attendee.

### ***End of Year Board Games***



To celebrate making it through another tough semester, Keramos hosted a dinner and board game night, where members new and old forgot about exams for a few hours with copious amounts of noodles and the fellowship of other Keramites. Members played games such as Codenames, Secret Hitler, Coup, and poker, fostering community and giving members sorely needed stress relief as the semester wraps up and finals begin.

### ***Initiation Pottery***

In a twist on tradition, new initiates were encouraged to use our pottery wheels, slip casting facilities and the creativity of their hands to play with clay. Members created the Keramos badge as in previous years but followed it up with artistic exploration and learning of the various techniques involved in artistic ceramics.

### **Conclusion**

The 2021-2022 academic year has seen great changes in the Colorado School of Mines Keramos chapter. The chapter has nearly tripled in size, and greatly expanded its offerings, particularly through the bi-weekly lunch and learns, which have greatly increased our recognition on campus and provided our members with career development opportunities. While Keramos has at times struggled with technical issues in the glass shop, supply chain issues with pottery, or in finding new officers, we have persevered and created a strong structure and community for the coming semesters. Keramos has fostered stronger ties to the Materials Advantage chapter and looks forward to working with them in future outreach and social events, which will reduce the planning and financial burden on both organizations. The glass shop continues to expand and cement itself as a unique community and experience at mines, with fundraisers being more successful than ever. As more users become acquainted with the pottery studio, we will expand our operations and offer consistent studio times. Finally, we have built a community that can come together both as engineers and as friends, unique, unforgettable, and as tough as SiC-SiC composite.

