The Mines Alma Mater, to the tune of "Aura Lee," is played during Commencement to acknowledge graduates' transition from Mines students to Mines alumni.

Lyrics for the Mines Alma Mater were written by Lois Mesinger Leonard, wife of Weldon I. Leonard, Engineer of Mines, 1549.

Raise your voices engineers, your devotion sing
To the greatest School of Mines, let the chorus ring
Hall to thee, CSM to our hearts most dear
Ev'ry miner lauds same and ev'ry engineer.

Honor, glory to thy name, these we pledge anew
While we live to sing thy fame, Alma Mater true
Hall to thee School of Mines, silver and blue
Ev'ry Miner sings thy praise, Alma Mater true.

Photography by Billy Cicconi '18, Joe DelNero, Agata Bogucka
MATERIAL OF ENGINEERING | MASTER OF SCIENCE continued

COMPUTER SCIENCE
Dr. Tracy K. Camp, Department Head

Computer Science, Master of Science
Hosam Mohammad Abdulkarim
Alex Stuart Anderson
Salchand Banuapalli
Colleen Marie Gough
Ryan Blake Jakson
Tiffany Rae Kain
Michelle Anne Knapke
James Thomas Miler
Jordan Wayne Moser
Steven Baxter Tenenolt
Paul T. Sottos
Samuel Robert Schmidt
Joshua James Southworth
Mikf Thanh Vu
Yufei Zou

ELECTRICAL ENGINEERING
Dr. Atif Z. Elsherbeni, Department Head

Electrical Engineering, Master of Science
Max L. Bubel
Yu Phong Dang
Curt Jacob Palkin
Samuel Elliot Friedman
Colin A. Hoven
Shaun Paul Watson
Zhifei Zhu

MECHANICAL ENGINEERING
Dr. John Berger, Department Head

Nuclear Engineering, Master of Engineering
Ryan Matthew France

Materials Science, Master of Science
Henry Edward Gereigleng

Mechanical Engineering, Master of Science
Michael William Abraham
Joshua Kelly Betz
Sachin Bhattacharjya
Nicholas Anthony Booth
Erath Christopher Deuschle
Adam William Fox
Stephan T. Goertzen
Joshiel Arne Grinok
Robert Collins Hall
Maria Rose Hollquist
Zahra Sadoon Khawaja
Bibhushan Shridhar Kini
Ian E. Kramer
Hyolley Rose Lamson
Reba Dinor Masri
Bahrn Dinor Masri
Gabriel Wesley Martin
Conner McCoy-McKeon
Aanubh Mishra
Samravela Murvud Moryard
Styler Austin Morris
Watt James Ode
Samuel James Schuhbort
Darian James Seidle
Allison Lynn Pelzel
Adam Pepliscz
Joseph Matthew Pohl
Samuel Petzel
Dilan Gray Ridgier
Dillon Ian Roiter
Erika F. Schuster
Prasenting Sengarugui Sereha
Huihuan Yang

DOCTOR OF PHILOSOPHY

College of Earth Resource Sciences and Engineering
Dr. Ramona M. Graves, Dean

MINING ENGINEERING
Dr. Precilla R. Nelson, Department Head

Mining and Earth Systems Engineering, Doctor of Philosophy
Zohar Khodemian

GEOLOGY AND GEOLOGICAL ENGINEERING
Dr. M. Stephen Enders, Department Head

Geochemistry, Doctor of Philosophy
Richard L. Avery

Geological Engineering, Doctor of Philosophy
Matthew David Minick

Geology, Doctor of Philosophy
Ben Michael Froman

PETROLEUM ENGINEERING
Dr. Erdal Ozkan, Department Head

Petroleum Engineering, Doctor of Philosophy
Mohammad Farsh旭Baughman

GEOPHYSICS
Dr. John H. Bradford, Department Head

Geophysical Engineering, Doctor of Philosophy
Paul Marcel El Inouye

Hydrology, Doctor of Philosophy
James Joseph Breseler

Mineral and Energy Economics, Doctor of Philosophy
Sui-Mi Lee

ECONOMICS AND BUSINESS
Dr. Rodney G. Eggert, Division Director
College of Applied Science and Engineering
Dr. Michael J. Kaufman, Dean

GEORGE S. ANSELL DEPARTMENT OF METALLURGICAL AND MATERIALS ENGINEERING
Dr. Angus A. Rockeit, Department Head

Materials Science, Doctor of Philosophy
Chuanwen Guan
ADVISOR: Ryan O’Shea CO-ADVISOR: Jianhua Tong
Ceramic Electrochemical Cell For Power Generation and Fuel Production

Anna Girma (Ayesha)
ADVISOR: Ejidike Elumah CO-ADVISOR: David L. Olsen
Flow Accelerated Corrosion Of The Heat Exchange Carbon Steel Tubs In Air Generated Condensers

Chunyan Xiao
ADVISOR: Brian E. Golden CO-ADVISOR: Mowafak Al-Jassim
Characterizing Au-SiO2: An Insight Into The Impingement Plasma Miroscopie Technique To Saturate Cell Materials

Metallurgical and Materials Engineering, Doctor of Philosophy
Brett Nathaniel Carlson
ADVISOR: Patrick R. Taylor CO-ADVISOR: Donald E. Spiller
Recycling of Nickel-Manganese-Iron-Boron Magnet Waste By Selective Sulfur Roasting

Hao Cui
ADVISOR: Corby G. Anderson
Hydrometallurgical Treatment Of E-Scrap

Taylor Rich Jacobs
ADVISOR: David K. Matlock
Elevated Temperature Mechanical Properties Of Pipe Steel Plates

Douglas James Schirmer
ADVISOR: Patrick R. Taylor
Experimental Investigation of Fundamental Viscoelastic, Density, and Loading/Shear Characteristics Of Sodium-Iron-Silicate Slags

Igor Eduardo Silva Vieira
ADVISOR: Emmanuel L. De Moor
Tempering Precipitates Of Heat Hardenable/Bainitic Microstructures In Quenched And Tempered Plate Steels

CHEMICAL AND BIOLOGICAL ENGINEERING
Dr. Jennifer Wilkins, Department Head

Chemical Engineering, Doctor of Philosophy
Andrew Raymond Motz
ADVISOR: Anthony H. Haring
Development Of Heterosporous-Containing Polymer Electrolytes For Use In Electrochemical Energy Conversion Devices

Rafael Andriwichov Arayanan
ADVISOR: Sumit Agarwal
Surface Phenomena During the Anodic Layer Deposition On Silicon-Based Oxides

CHEMISTRY
Dr. Thomas Gennert, Department Head

Applied Chemistry, Doctor of Philosophy
Samuel Underhill Gage
ADVISOR: Ryan M. Richards CO-ADVISOR: Svetlana Polyansko
Controlling Functionality and Making Structure-Property Correlations In Nanostructured Metal Alloys

Engineering-Civil Specialty, Doctor of Philosophy
Tingting Chen
ADVISOR: D. Y. Griffiths CO-ADVISOR: Rosselin Kazemi
Integrated Reservoir Characterization In Dry Salt Basins: A Continual CIP Method Bor Project

Environmental Science and Engineering, Doctor of Philosophy
Martin Alexander Dangelmayr
ADVISOR: Linda A. Rigolotta
Biogeochemical Cycles Of Uranium, Radiation And Transport

Christopher Joseph Raybould
ADVISOR: John E. McCloy CO-ADVISOR: Terri S. Heagle
Spatial-Temporal Assessment Of Groundwater Resources In The Denver Basin Aquifer System

METEOROLOGY
Dr. Tracy C. Campbell, Department Head

Computer Science, Doctor of Philosophy
Tara Bourouba Hosseini
ADVISOR: Dinesh P. Mehta
Improved Methods To Compare Distance Metrics Using Uniform Random Spanning Tree And Their Applications In Network Analysis

Reese Xin
ADVISOR: Hui Zhang CO-ADVISOR: Hui Wang
Real-Time Learning For Long-Term Collaborative Autonomy

ELECTRICAL ENGINEERING
Dr. Joel Z. Eshkenazi, Department Head

Engineering-Electrical Specialty, Doctor of Philosophy
Erik X. Yung
ADVISOR: Michael B. Wakin
Structured Low-Density Matrix Recovery Via Optimization Methods

MECHANICAL ENGINEERING
Dr. John Berg, Department Head

Mechanical Engineering, Doctor of Philosophy
Abdulrahman Al-Falah
ADVISOR: Christian Ocampo
Growth, Structure, And Properties Of Selected Two-Dimensional Materials For Next-Generation Functional Theory Investigations

Ashley N. Bucak
ADVISOR: Aaron P. Steinberg
Dissipating Deformation Mechanisms In Shape Memory Alloys Using 3-D Printing Fabrication

Garrison Michael Hanns
ADVISOR: Aaron P. Steinberg CO-ADVISOR: Adam Pichereau
Mechanism Of Blood Fatigue Crack Initiation In Ti-6Al-4V Under Cyclic Tension-Torsion Loads

DOUBLE DEGREE RECIPIENTS
Martin Alexandra Dangelmayr
Master of Science, Environmental Science and Engineering
Amma Girma (Ayesha)
Master of Science, Materials Science
Reza Andriwichov Arayanan
Master of Science, Chemical Engineering

Master of Science, Chemical Engineering
Rezay Dangelmayr
Master of Science, Chemical Engineering
Undergraduate Commencement
May 11, 2018  Mary Kay Stadium, Golden, Colorado

Board of Trustees
Thomas Jorden ’80, MS ’87, Chairman
Timothy Haddad ’70, Vice Chairman
Charlie McNeill ’81
Jesus Salazar ’52, MS ’72
Lucinda Sanders
Patty Starner ’83
Richard Trudy

Faculty
Sasi Prakasha
Swift Stuwart

Ceremony
Processional
University March, carried by Dr. Craig P. Taylor
The book, De Re Metallici, carried by Dr. Reed Maxwell

National Anthem
Colorado School of Mines National Miners

Welcome
Dr. Paul C. Johnson, President

Student Address
Megan Rose Lea Auger, mechanical Engineering

Distinguished Speaker
Mr. Harold M. Korell, ’58

Recognition of Commissioned Cadets
Colonel John Caimiog, United States Air Force

Announcement of Baccalaureate Degree Recipients
Presentation of the Class of 2018 to the Board of Trustees
Dr. Paul C. Johnson

Acceptance of Class
Mr. Thomas Jorden ’87, Chairman of the Board of Trustees

Conferment of Degree
Dr. Paul C. Johnson

New Mines Alumni Welcome
Ms. Patty Starner ’83, Trustee

Closing Remarks
Dr. Paul C. Johnson

Recessional
Audience is requested to stand and remain in place until the platform party has
exited the arena. Please join us for a new alumni reception immediately
following the ceremony in Harry D. Campbell Field at Mary Kay Stadium.

All graduates will be photographed by a professional photographer after receiving their diploma. Prints will be mailed to students by the photographer at their Mines mailing address.

Professional photographs can be ordered at events.life-touch.com/ Mines. General Commencement photos can also be downloaded from the Mines Alumni site at no cost. The site can be accessed at flickr.com/photos/coloradostrongalumni.

Baskelor of Science
Class of 2018

College of Earth Resource Sciences and Engineering
Dr. Ramona M. Grutes, Dean

MINING ENGINEERING
Dr. Yvonn P. Nelson, Department Head

William Wyatt Belcher
Ryan M. Stevens
Ryder David Brandt
Michael Joseph Cerr
Brandon Michael Coleman
Roland Adrian Daniels
Alice Marie Goodwin
Iza Allan Grossinger
Michael Alexander Karl
Juan Patrick McConnor
Kaylin Lee Osborn
Christine Tao Peterson
Adam Edward Poulson
William Michael Reyes-Silvis
Ruth Ann Michael Smythe

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MINING ENGINEERING, Bachelor of Science

GEOLOGY AND GEOLOGICAL ENGINEERING
Dr. D. Stephen Enders, Department Head

Geological Engineering, Bachelor of Science
Taremaki Zaki Al Safi
Wengen Car
Beatrice Ruth Compe
Brandon Jay Darke
Voy Quinlan Duron
Jacqueline Hesselberg
Samuel Alexander Grueber
Ashley Hill
Jesse M. Knisley
Armanda Aracena Lopez
Leah R. Macey
Adam Christopher Malsam
Rayne Matthew Meir
Eric Jude Miller
Logan Andrew Powell
Aven Ann Riekert
Kevin Thomas Ross
Martin Philip Roth
Kathleen Diana Rubenstein
Secia Patrick Schade
Sara Marie Schmidt
Adam Deesee Siple
Max R. Ulm
Lillian Ruth Vining
Jacob Ryan Weems

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GEOLOGY AND GEOLOGICAL ENGINEERING

PETROLEUM ENGINEERING
Dr. Tidjel Oszian, Department Head

Petroleum Engineering, Bachelor of Science

Elba Abdallah
Mohammad Ashraf Abdul Rahim
Ismail Basher
Rais Mani Adnan
Thamizh Ve. A. Al Ansari

Cairo, Egypt
Penang, Malaysia
Kuala Lumpur, Malaysia
Kuwait City, Kuwait

PETROLEUM ENGINEERING

All summary data is taken from Undergraduate Commencement program.

College of Earth Resource Sciences and Engineering
Dr. Ramona M. Grutes, Dean

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PETROLEUM ENGINEERING
Dr. Tidjel Oszian, Department Head

Petroleum Engineering, Bachelor of Science

Elba Abdallah
Mohammad Ashraf Abdul Rahim
Ismail Basher
Rais Mani Adnan
Thamizh Ve. A. Al Ansari

Cairo, Egypt
Penang, Malaysia
Kuala Lumpur, Malaysia
Kuwait City, Kuwait

Programs of Study at the Colorado School of Mines
**BACHELOR OF SCIENCE continued**

<table>
<thead>
<tr>
<th>Name</th>
<th>City</th>
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<tbody>
<tr>
<td>Seth Joseph Lelu</td>
<td>Fairview, Texas</td>
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<tr>
<td>John Huu Comley Luck</td>
<td>Manda, Philippines</td>
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<td>Trenton August Long</td>
<td>Gothenburg, Nebraska</td>
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<td>Brandon Arthur Lueders</td>
<td>Jackson, Missouri</td>
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<td>Evan Corrin Lauren</td>
<td>Centennial, Colorado</td>
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<td>Timothy Ross, Jr.</td>
<td>Colorado Springs, CO</td>
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<td>Andrew Patricia Lyons</td>
<td>Westminster, CO</td>
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<td>Michael Mihal</td>
<td>Westminster, CO</td>
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<tr>
<td>James Roland Mekesz</td>
<td>Weatherly, PA</td>
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<tr>
<td>Megan Nicolas Mancini</td>
<td>Tomball, TX</td>
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<td>Cameron Allen Maxey</td>
<td>Greeley, CO</td>
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<tr>
<td>Scott Patrick Neyer</td>
<td>Westminster, CO</td>
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<tr>
<td>Benjamin S. Misulis</td>
<td>Pueblo, CO</td>
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<td>Grant David Mehan</td>
<td>Parker, CO</td>
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<td>Duncan Riley McElroy</td>
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<td>Alyssa Gabrielle Mendoza</td>
<td>Houston, TX</td>
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<td>Cameron Stephen Metzger</td>
<td>Westminster, CO</td>
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<tr>
<td>Keith Chetan Nusty</td>
<td>Greenfield, PA</td>
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<tr>
<td>Elizabeth Ann Harechik</td>
<td>Brush, CO</td>
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<tr>
<td>Chayce Daniel Kowitz</td>
<td>Pasadito, Harrell</td>
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<td>Brian Zachary Morgan</td>
<td>Monument, CO</td>
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<td>Ryan Thomas Aronsen</td>
<td>Leadville, CO</td>
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<td>Lucas Bradford Morse</td>
<td>Fort Collins, CO</td>
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<td>Stephanie Patrick Mulligan</td>
<td>Littleton, CO</td>
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<td>Hannah fees</td>
<td>Highlands Ranch, CO</td>
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<td>Ben Rowland</td>
<td>Carbondale, CO</td>
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<td>Henry David Myers</td>
<td>Dakota, CO</td>
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<td>Jacob Williams Myers</td>
<td>Carlisle, PA</td>
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<td>Patrick Austin Myers</td>
<td>Hinsdale, WA</td>
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<td>Kevin Eric Hoben</td>
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<td>Chi Thong Tran Nguyen</td>
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<td>Vincent Bui Nguyen</td>
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<td>Samuel David Nickels</td>
<td>Lakewood, CO</td>
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<td>Emily Anne Nisbet</td>
<td>Dallas, TX</td>
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<td>Joshua Franklin Nine</td>
<td>Carlisle, PA</td>
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<td>Mohamed Ali Obeid</td>
<td>Harrisburg, WA</td>
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<td>Petronio Leroy Egea, Jr.</td>
<td>Delaware, CO</td>
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<td>Robert James Delng II</td>
<td>Arvada, CO</td>
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<td>Tanner D. Rusty O’Lecky</td>
<td>Manroth Lakes, CO</td>
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<td>Philip Gregory O’Dorford</td>
<td>Bennett, CO</td>
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<td>Dylan William Yatschke</td>
<td>Manitou Springs, CO</td>
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<td>Mitchell Anthony Patterson</td>
<td>Cripple Creek, CO</td>
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<td>Tyler Allan Pena</td>
<td>Dripping Springs, TX</td>
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<td>Emily Brooks Perrin</td>
<td>Canon City, CO</td>
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<td>Christian Rolf Peterson</td>
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<td>Lucas Alan Peterson</td>
<td>Gunnison, CO</td>
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<td>Kyley Michael Nol</td>
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<td>Morgan Davis Hertfitt</td>
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<td>Colm Antinheiro de la Roche</td>
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<td>Maxwell Wolfgang Reichard</td>
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<td>Zachary Charles Rieger</td>
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<td>Abigail Elizabeth Reuland</td>
<td>Idaho, CO</td>
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<td>Jacob Thomas Roberts</td>
<td>Dripping Springs, TX</td>
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<td>Frederico Miguel Rosado</td>
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<td>Estrella Elizabeth Heydley Ross</td>
<td>Houston, TX</td>
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**UNDERGRADUATE CEREMONY KEYNOTE**

May 11, 2018 | Marv Kay Stadium | Golden, Colorado

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**Mr. Harold M. Korell ’68**

Retired Oil and Gas Executive

Harold M. Korell ’68 graduated from Colorado School of Mines with a professional degree in chemical and petroleum refining engineering. In 1968, he began his career with Mobil Oil Corporation. Subsequently, he held various positions with Tenneco Oil Co., McCormick Resources and American Exploration Co. In 1997, he joined Southwestern Energy Company as Chief Operating Officer and was named Chief Executive Officer in 1999, and later Chairman of the Board. Korell led the company through its discovery and development of the Fayetteville Shale in Arkansas, one of the pioneering developments of the shale plays in North America and the world. This discovery was considered to be largely responsible for today’s abundant oil and gas supplies. Korell served as the CEO and chairman of Southwestern Energy until his retirement in 2013, whereupon he continued to serve as chairman of the board until May 2014. Notably under Korell’s leadership, Southwestern Energy achieved the honor of being the number one performing company in the S&P 500 from 2000 to 2010. Korell was awarded the prestigious Chief Roughneck Award by his peers in 2009. He was awarded the Mines Distinguished Achievement Award in 2004.

Korell is a licensed professional engineer in Texas and Colorado. He is a member of the Society of Petroleum Engineers, IPAA and was a founding member of America’s Natural Gas Alliance. He served on the Dean’s Advisory Board of the College of Liberal Arts at the University of Arkansas and currently serves on the Mines Board of Governors, Baylor College of Medicine’s Board of Trustees and California Resource Company’s Board of Directors where he is also the lead independent director.
The Professor Everett Award, provided by Freiik Aasland '42, in honor of James R. Everett, an outstanding former faculty member in mathematics at Mines, is presented to a graduating senior in mathematics who demonstrates scholarship, leadership, community service and the potential for the innovative application of mathematics to mineral engineering.

Nicholas Rummel

The Ryan Sayon Memorial Award recognizes the outstanding academic achievements of a graduating student, majoring in engineering physics and/or applied mathematics and statistics, who has performed significant undergraduate research.

Connor Mattis (Computations and Applied Mathematics, Mines)

Jaden Davidson

The Harrison L. Tays, 1931, Award is presented in chemical and petroleum refining for demonstrating scholarship, personality and integrity of character and the general potentialities of a successful industrial career.

Johanna Maozland

The Sellin Memorial Scholarship is presented by the faculty of the Department of Chemical and Biological Engineering to a graduating student who promises great success in graduate school.

Rachel Minzen

The Pearson Potential Award is given to students in the Department of Chemical and Biological Engineering who have shown engineering leadership and engineering potential in hands-on challenges such as Summer Field Session.

Bella Yu (Chemical and Biochemical Engineering)

Christopher Habsburg (Chemical Engineering)

The Outstanding Senior Research Award in Chemistry is awarded to a student who demonstrates superior performance and creativity in undergraduate research.

James Baumann

The Robert A. Butler Award is presented for meritorious work in chemistry.

Alfsha Eiskow

The American Institute of Chemists Award is given to a top graduating senior in chemistry.

Juliet Hullen

The Outstanding Undergraduate Researcher Award is given to a top graduating senior who helped improve computer science at Mines.

Victoria Girkis

The Brunton Award in Geology is awarded in recognition of the highest scholastic achievement and interest and enthusiasm for the science of geology.

Jacob Weems

The Neal J. Harr Memorial Outstanding Student Award, provided by the Rocky Mountain Association of Geologists, is presented for scholastic excellence in the study or geology with the aim of encouraging future endeavors in the earth sciences.

Leah Macey

The Hutchinson Award is presented for meritorious work in engineering.

Arkel Rickel

The Cecili H. Green Award is given to the graduating senior in geophysics, in the opinion of the Department of Geophysics, the highest attainment in the pursuit of scholastic achievement, personality and integrity.

Dilyane Marsolek

The George R. Pickett Memoir Award is presented on the basis of demonstrated interest and accomplishments in the study of orebody geophysics.

Courtney Bongio

Bennett Hoogenboom

The George T. Meredith Award, established in 2012 by Keith A. ’52 and Mary Ann Meredith, is awarded to an outstanding graduating geophysics student who has demonstrated academic excellence, community involvement and potential for leadership.

Drayton Dummire

The Joan C. Hollister Award is presented to the most deserving student in geophysics and is not based solely on academic performance.

Kileen Marberry

The Maryana Bell Kaladar Award is presented to the graduating senior who has excelled in humanities courses and humanities-related activities.

Kyle Markowski

The John Steele Facility Choice Award is awarded to a top graduating senior whose contributions significantly strengthened the Department of Mechanical Engineering.

David Whisenhunt

Charles N. Christopher Award, provided for by Mr. bell, is a Brunton transit, awarded in mining for completing a course in mining and showing the most progress in schoolwork during the entire term for which the course is given.

Adam Polack

The Clark B. Carpenter Award is presented to the graduating senior in mining engineering, in the opinion of the faculty, to the student who has been the most outstanding student in mining and metalurgy and the professor in charge of the respective department is the most deserving of this award.

Riland Daniels

The B. D. W. Brunator Award, provided for by Mr. Brunator, is awarded for meritorious work in mining.

Christine Peterson

The E. G. Washburn Award is presented in mining for good scholastic record and active participation in athletics.

Nathan Smythe

The Gil Timmer's Club Award is presented to the graduating senior who, in the opinion of the Department of Mining Engineering, has shown high academic standing in coal mining engineering and potential for the coal industry.

William Reyes-Silvis

The Alan Klossack Award is awarded to a graduating senior in mining and metalurgy and recognizing achievements in the field of mining and metalurgy.

Ac Silvia (creative effort in outreach)

Molly Thun (creative effort in outreach)

Rheagidrancher (creative effort in outreach)

Jonathan Sumner Evans (Creative effort in outreach)

David Zorkert (Electrical Engineering)

David Zorkert (Geological Engineering)

Felicia Nuñoradwait (Geophysiology)

Alexandra Joseph (Mechanical Engineering)

John Copley (Mechanical and Materials Engineering)

William Brehm (Mining Engineering)

Nathan Mills (Petroleum Engineering)

The University Ethics Scholar Award is presented to a student who has shown academic, professional and personal integrity.

Ian Kramer (Graduate)

The McBride Horors Program Distinguished Graduating Senior Award is presented to a student who has demonstrated academic achievement.

Matthew Kowalski

The McBride Horors Program Award for Campus Citizenship is presented to a student who has made a significant and positive impact on the campus community.

Samantha Beck

The Outstanding International Undergraduate Award is presented to the international student who has demonstrated scholastic achievement.

Pietra Aliperti (WINNER)

Nolly Reichert

Matthew Martin

The Outstanding Student Service Award is presented by the Division of Student Life to the student who, during their tenure at Mines, exhibited above and beyond their normal role, vigorously participated in activities or projects for the greater benefit of their peers and community.

Tyler Evans

The William D. Volkman Award is presented to the graduating seniors who have consistently demonstrated the utmost integrity, scholarship and citizenship in and outside of the classroom throughout their collegiate career.

Nathan Mills
ACADEMIC HONORS, SCHOLARS AND HONOR SOCIETIES
Class of 2018

Mines awards the academic honors designations of summa cum laude, magna cum laude, and cum laude. The honor cords worn by students earning the highest designation, summa cum laude, are royal blue and orange. Magna cum laude is represented by light blue and orange. Cum laude is represented by silver and orange. Honor cords and stoles are also worn to signify involvement in athletics, honor societies, scholars programs and recognition of international students.

SCHOLARS AND SPECIAL PROGRAMS

BLUE KEY HONOR SOCIETY
Recognizes students with achievements in service, scholarship, and activities. Students wear blue cords.
Chayaporn Bhokmakmoroko
Brooke Cathon
Madison Clark
Daniel DeCio
Joshua Efstati
Abigail Eustace
Brake Freyett
Sam Fynes
Emily Garmer
Amy Goldstein
Eric Hale
Jessica Hansoon
Megan Hansson

MCBRIDE HONORS PROGRAM
The K. T. McBride Honors Program in Public Affairs allows students to explore the interfaces between their areas of technical expertise and the humanities and social sciences, resulting in a minor in public affairs with the honors distinction. Students wear orange and white cords.

Samantha Beck
Brooke Cawthon
Jaana Clark
Aisha Eskew
Samuel Fynes
Catherine Giesenngen
Meghan Hansen
Joshua Helnick
Elise Irvine
Matthew Kowalsky

MILITARY COMMISSIONS
The following students will be commissioned as Second Lieutenants in the United States Air Force:

John W. Boswell, Mechanical Engineering
Timothy D. Crandall, Computer Science
Timothy A. Kelvill, Mechanical Engineering

The following student will be commissioned as a Second Lieutenant in the United States Army:

Christopher S. Lebron, Metallurgical and Materials Engineering

ORDER OF OMEGA
Recognizes outstanding leadership in fraternities and sororities. Students wear gold and orange cords.

Colton Aldridge
Dumir Basich
Rachel Brehm
Trey Brewer
Brooke Cawthon
Beverly Carson
Renea Cordero
Emily Creamer
Catherine Giesenngen
Luree Harrison
Taylor Helge
Elise Irvine

TAU BETA PI
A National Honor Society of Engineers that recognizes engineering scholarship. Students wear stoles instead of cords.

Jacob Aas
Maria Albeekova
Emily Atkinson
Chayaporn Bhokmakmoroko
Mohd Yuzdi Farhan B. Osman
Fars Izzat bin Rosli
Travis Bloom
Brooke Cawthon
Stefan Clark
Matthew Cookson
Kerrene Copley
Antonio D’Sposito
Daniel DeCio
Matthew Delauff
Marc Dudley
Denon Dunmore
Isaac Eastman
Tylor Eckstead
Abigail Eustace

Graduate Awards

CHEMICAL AND BIOLOGICAL ENGINEERING OUTSTANDING THESIS AWARD
Andrew Motz, Doctor of Philosophy, Chemical Engineering

MENDENHALL PRIZE
The Mendenhall Prize is awarded by the Department of Geosciences to the department’s outstanding graduate student.
Samir Jeel, Outstanding Master of Science

MILITARY COMMISSIONS
The following student will be commissioned as a Second Lieutenant in the United States Army:

Feter S. Lee, Graduate Studies, Engineering and Technology Management

W. WESLEY ECKENFELDER GRADUATE RESEARCH AWARD BY THE AMERICAN ACADEMY OF ENVIRONMENTAL ENGINEERS AND SCIENTISTS
This award is given each year to an environmental engineering or environmental science graduate student whose research contributes to the knowledge pool of wastewater management.
Andrew Pfluger, Civil and Environmental Engineering

THE DR. BHAKTA RATH AND SUSHANA RATH RESEARCH AWARD
This award recognizes a Mines doctoral graduate whose thesis demonstrates the greatest potential for societal impact.

Suancheng Puang, Materials Science

RATH AWARD RUNNER UP
Andrew Pfluger, Civil and Environmental Engineering

RATH AWARD FINALISTS
Samuel Gage, Chemistry
Feli Han, Computer Science
Zoheer Khadamian, Mining Engineering
Sun-Ke Lee, Economics and Business

Faculty Recognition

CARRIER OF THE UNIVERSITY MACE
Dr. R. Craig Tyler, Faculty Distinguished Lecturer

CARRIER OF THE BOOK: DE RE METALLICA
Dr. Reed Maxwell, Faculty Senate President

BOETTCHER SCHOLARS
The Boettcher Scholarship is a prestigious, merit-based academic scholarship. Boettcher Foundation Scholars wear red/orange cords.
William Austin
Tabitha Kalis

DANIELS FUND SCHOLARS
The Daniels Scholarship Program provides a four-year scholarship for students who demonstrate exceptional character, leadership and a commitment to serving their communities. Students wear stoles.

Khanh Duong
Mishaeta Keiser
William Majer
Daniel Martinez

HARVEY SCHOLARS
Many Mines students benefit from scholarships provided by our generous alumni and friends. The Harvey Scholars program provides full tuition for four years. Students wear light blue, gray and orange cords.

Amanda Giles
Samantha Beck
Brooke Cathon
John Copley
Matthew Dehaard
Kellen Malore
Nicholas Rummel
Celeb Schelle
Katica Steinman
Zhiqu Zhang

SENIO GIFT
Thank you to this year’s graduates whom embraced the tradition of a senior gift to support and inspire the next generation of Cregggers. Combined with a matching gift by President and Mrs. Johnson, this year’s Senior Gift program totaled $4,400 to support student organizations and activities.

Seniors supported the Student Emergency Fund, Mines Without Boarders, McBride Honors Program and the Multicultural Engineering Program, among others.

Colorado School of Mines | 23
A public research university with a global reach, engaging innovative thinkers to create solutions for today's earth, energy and environmental challenges.

COLORADO SCHOOL OF MINES
Class of 2018

Colorado School of Mines is a public university focused on science and engineering, dedicated to pioneering research that addresses the challenges society faces today and committed to educating students who will do the same.

Founded in 1874 as an institution specializing in silver and gold, Mines has since expanded its mission well beyond the extraction and use of natural resources. While still a powerhouse in mining, petroleum and earth sciences, the university has become a world leader in advancing responsible stewardship of the Earth, discovering and synthesizing new materials and developing innovative ways of harnessing traditional and novel energy sources.

Growing strengths include big data, bioengineering, biotechs, machine learning, nuclear science, optics, robotics and space, among numerous other disciplines.

Students at all levels take part in this groundbreaking research, one of the many ways the university prioritizes teaching. Techniques such as studio classes, inverted classrooms and video lectures maximize learning, creating sought-after graduates.

Mines students graduate with a strong sense of integrity, resilience, confidence in tackling new problems, the ability to work in collaborative environments, an enhanced sense of responsibility to promote positive change in the world and pride in their Mines degree.

ACADEMIC REGALIA: CAPS, GOWNS AND HODDS

The academic dress worn by today's graduates reflects a tradition begun in the late 12th century, when universities were first taking form, and codified in the U.S. in 1895 under the Academic Costume Code. Originally the degree may have had a practical purpose—to keep the student warm in unfurnished buildings—but today it is ceremonial and divided into three parts: caps, gowns and hoods.

The traditional cap is the mortarboard with colored tassels to identify the graduate's discipline or field of study. Doctors of philosophy wear a silver tassel, masters of science a yellow tassel, masters of engineering an orange tassel and bachelors of science a navy and silver commemorative tassel.

Bachelor's and master's gowns are untrimmed, but doctor's gowns are faceted, the front with velvet and trimmed with three velvet bars across the sleeves. The velvet facing and bars are black or the color of the field of study.

Hoods are also black. The doctor's hood is 4 feet in length, and the master's is 3 1/2 feet. Colorado School of Mines hoods are lined with silver and blue, the official school colors. The velvet border on the hood, which is three and five inches wide for the master's and doctor's degree, respectively, identifies the field of study to which the degree pertains.

CONFERRRED DEGREES

Departmental degrees are awarded at Colorado School of Mines according to the order in which the department or program originally conferred a degree, dating back to the first Mines commencement in 1883, at which two mining degrees were awarded. The College of Engineering and Computational Sciences, established in 2011, offers the newest degrees.

SILVER DIPLOMAS

While the degrees granted by Colorado School of Mines are valuable and unique, so are the diplomas themselves. The Mines silver diploma is a long-standing tradition dating back to 1933, when Charles A. Schreiber engraved a silver diploma as a gift for his son, a recent graduate. The diploma caught the eye of then-President Melville F. Codding, who asked that silver diplomas be made for all Mines graduates.

Starting with the commencement of 1934, Mines began issuing silver diplomas, measuring 5 by 6 inches and encased in pure sterling silver. Creating these diplomas required two workers spending six weeks (or 500 hours) making 19 delicate engravings in each diploma.

Today the tradition of metal diplomas continues, with all students receiving a ticket/silver-plated diploma upon graduation from Mines.

FLAGS

The Mines community is a worldwide community with students hailing from a variety of countries. On the stage are the flags representing the home countries of our international students receiving degrees today. Students are represented from the following countries:

Graduate Students

<table>
<thead>
<tr>
<th>Country</th>
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<tbody>
<tr>
<td>Azerbaijan</td>
<td>Lebanon</td>
<td>Trinidad and Tobago</td>
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<tr>
<td>Brazil</td>
<td>Libya</td>
<td>Turkey</td>
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<td>Canada</td>
<td>Mongolia</td>
<td>United Arab Emirates</td>
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<td>Chile</td>
<td>Netherlands</td>
<td>Venezuela</td>
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<td>China</td>
<td>Nigeria</td>
<td>Vietnam</td>
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<td>Côte d'Ivoire</td>
<td>Saudi Arabia</td>
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<td>Germany</td>
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<td>India</td>
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<td>Indonesia</td>
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<td>Iran</td>
<td>Thailand</td>
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Undergraduate Students

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<th>Country</th>
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<tbody>
<tr>
<td>Angola</td>
<td>Canada</td>
<td>Indonesia</td>
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<tr>
<td>Canada</td>
<td>China</td>
<td>Japan</td>
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<tr>
<td>Czech Republic</td>
<td>Democratic</td>
<td>Kazakhstan</td>
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<td>Democratic</td>
<td>Kuwait</td>
<td>Lebanon</td>
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<td>Republic of the</td>
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<td>Malaysia</td>
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<td>Congo</td>
<td>Egypt</td>
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<td>Egypt</td>
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<td>Philippines</td>
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<td>Ethiopia</td>
<td>Germany</td>
<td>Russia</td>
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</tbody>
</table>

HONOR CORDS AND STOLES

At Colorado School of Mines, we hold all of our graduates in high esteem and recognize their achievements at commencement. In addition to the traditional cap and gown regalia worn at this event, Mines supports the wearing of stole and honor cords at commencement ceremonies by students representing recognized academic honors, honors programs, and honor societies; students with an international affiliation; members of Mines-recognized Greek letter societies; varsity student athletes; and, military and veteran students.

An honor cord is a cord consisting of twisted cords with tassels on either end. They signify specific academic achievement or membership in a recognized academic honor group or society. More than one cord may be worn at the same time.

A graduation sash is a decorative vestment worn by students who are members of college organizations for the purpose of recognizing academic achievement or association with an international group or program. Graduation sashes are made of cloth, scarf-like garment worn over the shoulders adorned with the colors of the organization or country of affiliation.
Graduate Ceremony Information | Lockridge Arena | May 10, 2018

COFFEE AND FOOD
Starbucks in the Student Center will be open late for the ceremony, closing at 9 p.m.

EMERGENCY EVACUATION PLANS
If we need to exit quickly in case of fire or other emergency, please follow the instructions of Mines personnel. Take note of where your closest exits are located.

RECEPTION
A reception for graduates and their families will immediately follow the ceremony in the Ben Parker Student Center Grand Ballrooms. Please join us for light appetizers.

MISSING CHILDREN
If a child is missing, provide a detailed description to event staff for an announcement. Staff will provide instructions for where to meet the child when found.

LIVE STREAM AND SOCIAL MEDIA
Do you have family or friends who can’t attend the ceremony? Tell them to watch the live stream on the Colorado School of Mines YouTube page at youtube.com/lsar/ColoSchoolofMines.

Download a clip of your graduate walking across the stage; it is available for free at mines.stageclip.com as a gift to you and your graduate. Additional coverage of the ceremony can be found on various Mines social media outlets.

PHOTOS FROM THE CEREMONY
Pictures will be available for purchase from Lifetouch. Families and students can also download pictures taken by Mines photographers for free on the Mines Flickr site; flick.com/photos/colorado-school-of-mines.

LOST AND FOUND
Found items should be brought to the front desk of the Rec Center. After the graduate ceremony concludes and guests have left campus, items will be brought to the president’s office. Please contact Lisa Elson at 303-273-3486 or lelson@mines.edu to claim lost items.

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Commencement
Undergraduate Ceremony

Undergraduate Ceremony Information | Marv Kay Stadium | May 11, 2018

COFFEE AND FOOD
Starbucks in the Student Center will open early for the ceremony beginning at 6:30 a.m. Concessions in the stadium are located on the Concourse level.

EMERGENCY EVACUATION PLANS
If we need to exit quickly in case of fire or other emergency, please follow the instructions of Mines personnel. Take note of where your closest exits are located.

RECEPTION
A reception honoring graduates and their families will take place following the ceremony on Harry D. Campbell Field at Marv Kay Stadium.

MISSING CHILDREN
If a child is missing, provide a detailed description to event staff for an announcement. Staff will provide instructions for where to meet the child when found.

LIVE STREAM AND SOCIAL MEDIA
Do you have family or friends who can’t attend the ceremony? Tell them to watch the live stream on the Colorado School of Mines YouTube page at youtube.com/ColoradoSchoolof Mines.

Download a copy of your graduate walking across the stage; it is available for free at mines.StageClip.com as a gift to you and your graduate. Additional coverage of the ceremony can be found on various Mines social media outlets.

PHOTOS FROM THE CEREMONY
Pictures will be available for purchase from LilKetch. Families and students can also download pictures taken by Mines photographers for free on the Mines Flickr site: flick.com/photos/coloradoschoolofmines

LOST AND FOUND
Found items should be brought to the information desk outside of Gate 4. After the ceremony concludes and guests have left campus, items will be brought to the president’s office. Contact Lisa Elson at 303-273-3486 or laelson@mines.edu to claim lost items.

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COLORADO SCHOOL OF MINES
Class of 2018

CONGRATULATIONS TO OUR NEWEST ALUMNI!
The M stands for home, wherever your adventures take you! Stay connected to the Mines community and join an M Club. M Clubs are a local group of Orediggers who gather to have fun, network and support each other.

+ 10 International M Clubs:

Stay connected: Follow @minesalumni on Instagram, Facebook and Twitter and connect on LinkedIn. Visit minesalumni.com and catch the latest in our e-newsletter and Mines Magazine.

THE BOOK: DE RE METALLICA
The Colorado School of Mines Faculty Senate president leads the academic portion of the commencement procession, carrying a replica of the 16th-century treatise De Re Metallica. Widely regarded as the seminal text on mining and the science of metallurgy, this historic volume serves as a symbol of the body of knowledge shared by Mines’ faculty and students.

The book is placed on a stand at the front of the stage, its opening marks the start of the commencement ceremony and also recalls the beginning of the students’ education at the school. The ceremony’s end is signified by the closing of the book.

A first edition of De Re Metallica, written by Georg Bauer under the pseudonym Agricola and printed in 1556, resides in the vault of Mines’ Arthur Lakes Library, as does a subsequent edition printed in 1621. In addition to these original texts, the library also houses several copies of Herbert Hoover’s 1912 translation from Latin, including one signed by the nation’s 31st president and his wife, Lou. Hoover contributed the introduction and lengthy footnotes. He visited mine sites and carried out Agricola’s formulas in laboratories to check the translations. Issued in a limited edition, it quickly became a collector’s item. Of the 3,000 copies printed, more than half were given free to mining engineers and students.

UNIVERSITY MACE
The Colorado School of Mines Faculty Senate distinguished lecturer carries the mace, which has a rich history as a symbol of authority going back to the 13th century. In commencement processions the mace is carried before the president and the dignitaries composing the platform party. The Mine Mace stands 4 feet 8 inches high and weighs 16 pounds. The core is a rosewood staff, covered by fitted brass and cast bronze, silver-plated and topped by Mines’ mascot, Blaster. Mines Professor Emeritus Robert Taylor executed the design and Mr. Emil Dangreau produced the finished standard with the official school seal photoengraved on the base of the staff.

PRESIDENTIAL MEDALLION
The silver medallion, worn only by the Colorado School of Mines president, was designed by Rex Bull, emeritus professor in the George S. Ansell Metallurgical and Materials Engineering Department, and cast by students using silver donated by the Colorado School of Mines Alumni Association. It was first used at the inauguration of George S. Ansell as the 13th president of the school on February 8, 1989.

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