

VITA
Dr. Mark Alan Helper
Spring, 2022

MAILING ADDRESS:

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TELEPHONES:

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RELEVANT PERSONAL DATA:

Place of Birth: Urbana, Illinois
Date of Birth: January 20, 1956
Citizenship: U.S. Citizen
Family: Married, 2 children

FIELDS OF INTEREST: Tectonics, Metamorphic Petrology, Isotope Geochronology, Gemology, Lunar Geology, Field Geology, Geographic Information Systems

EDUCATION:

Ph.D., 1985, University of Texas at Austin, Austin, Texas. Dissertation title: "Structural, metamorphic and geochronologic constraints on the origin of the Condrey Mountain Schist, north central Klamath Mountains, northern California"; Advisor: John C. Maxwell.

1978-1979, University of Oregon, Eugene, Oregon.

B.S.: 1978, University of Illinois, Urbana, Illinois: thesis title: "Structural and petrographic study of the Monian (Precambrian) rocks of the Rhoscolyn District, Holy Island, Anglesey, North Wales"; Advisor: Dennis S. Wood.

PROFESSIONAL EMPLOYMENT:

Distinguished Senior Lecturer in Geological Sciences, 2007-present

- Instruct courses in Field and Stratigraphic Methods, Field Geology, Gems and Gem Minerals, GIS and GPS methods in Earth Sciences
- Field Camp Director
- Conduct research on Proterozoic tectonics of the SW US and East Antarctic craton, Laramide of Trans-Pecos Texas, Proterozoic of the SW US, Mineralogy of gems, Mesozoic subduction complexes in Alaska and N. California
- Collaborate with NASA researchers to develop and test robotic field instruments
- Train astronaut candidates and NASA personel in geologic field methods

Senior Lecturer in Geological Sciences, University of Texas at Austin, 2000-2007.

Lecturer in Geological Sciences, University of Texas at Austin, 1986-1999.

Geological Consultant, 1991-present. Licensed Professional Geoscientist, License #4010, State of Texas.

Schlumberger Austin Product Center - Lectures, fieldtrips, preparation of geology field guides for the Austin area.

US Borax - Fieldtrips to examine Precambrian marbles for industrial mineral potential.

Elegant Marble Imports, San Antonio, TX - Identification and US Customs classification of imported stone tiles.
D.B. Stevens – GIS training for earth science consultants, geological consulting.

Assistant Instructor, 1984-1985, University of Texas at Austin. Elementary field methods, summer field camp.

Teaching Assistant, 1980-1982, University of Texas at Austin. Elementary field methods, Optical Mineralogy and Crystallography, summer field camp.

Field Geologist, 6/82-9/82, Arco Exploration Co., Denver, CO. Mapping, structural analysis and synthesis, Montana Overthrust Belt.

Field Geologist, 6/81-9/81, California Division of Mines and Geology, Sacramento, CA. Mapping in central Klamath Mts. for state geologic data base augmentation program.

Field Assistant, 6/80-9/80, U.S. Geological Survey, Menlo Park, CA. Mapping with Dr. R. G. Coleman in the Marble and Condrey Mt. Wilderness Areas, Klamath Mountains, CA.

Research Assistant, 9/79-6/80, Texas Bureau of Economic Geology, Austin, TX. Compilation of production histories for selected oil and gas wells, Texas Gulf Coast; subsurface mapping and well log interpretation.

Petroleum Geologist Intern, 6/79-9/79, Exxon Co. USA, Oklahoma City, OK. Evaluation of production trends in Ordovician Fms. of the Ardmore and Marietta Basins, southern Oklahoma.

Petroleum Geologist Intern, 6/78-9/78, Exxon Co. USA, Katy, TX. Located stratigraphic traps in a mature Gulf Coast gas field.

Research Assistant, 1/78-6/78, Illinois State Geological Survey, Quaternary Research Div., Urbana, IL. Tested mechanical properties and clay mineral contents of Illinois coal seam underclays.

FIELD EXPERIENCE:

University of Texas Field Camp: Texas, New Mexico, Arizona, Colorado, Utah, Montana, Wyoming, Idaho. 1981 (Teaching Assistant), 1984 (Assistant Instructor), 1985-1996 (Lecturer/Senior Lecturer), 1997-present (Director).

University of Texas Field and Stratigraphic Methods: central Texas, 1982 (Teaching Assistant), 1984-1985 (Assistant Instructor), 1986-present (Lecturer/Sr. Lecturer/Distinguished Sr. Lecturer).

NASA Astronaut Field Training: central and northern New Mexico

NSF-related field work: Heimefrontfjella, Dronning Maud Land, Antarctica, 1996-1997.

NSF-related field work: Caborca, Sonora, Mexico, 1994.

NSF-related field work: Shackleton Range and Coats Land, Antarctica, 1993-1994.

Grant-related field work: Kenai Peninsula, Alaska, 2018; 2019

Grant-related field work: Turkana, western Kenya, 2015

Grant-related and other research: Llano Uplift, central Texas, 1992-present.

Grant-related and dissertation field work: Klamath Mountains and northern Coast Ranges, California and Oregon, summers, 1980-1987; 2007; 2016; 2017; 2019
California Coast Ranges, 1982.

Sentinel-Arlington Volcanic Field, Gila Bend, Arizona, 2007.
 Devon Island, Canadian Arctic, 2009
 Trans-Pecos Texas, 2008-present.
 Tamaulipas, Mexico, Spring and Summer, 2005, 2006.
 Northern Apennines, Italy, summer, 1985.
 Naragansett Basin, Rhode Island, summer, 1984.
 Western Montana Overthrust, summer, 1982,
 Central Coast Ranges and Cascade Mts., Oregon, spring, 1980.
 Holy Island, North Wales, U.K., summer, 1977.
 British Isles Field Camp, U.K., summer, 1977 (student).
 University of Illinois Field Camp, Wyoming, summer, 1976 (student).

Organized Field trip Participation/Leadership: Argentine Andes, 2017; San Luis Basin, CO&NM, 2016; Western Newfoundland, 2016; Svalbard/Spitsbergen, 2013; Scotia Arc, 2013; Atacama Basin, Puna Plateau, Chile, 2008; Sentinel-Arlington Volcanic Field, AZ, 2007, 2008; Uinta Mts., UT, 2005; Death Valley, CA, 2000; northern and central NM, 1994; Colorado River extensional corridor, CA&AZ, 1992; Coast Ranges, CA, 1982, 1986, 2007; North Cascades, WA, 1983; Klamath Mts., CA, 1979, 1992; Ouachita Mts., OK&AR, 1980, 1982; Trans-Pecos, TX, 1978, 1984, 1990, 1993, 1998; Marquette Trough, U.P. MI, 1976; Smoky Mountains, TN, 1975; western US Cordillera 1985-present.

PROFESSIONAL SOCIETY MEMBERSHIP

Geological Society of America
 Sigma Xi
 Phi Kappa Phi

PROFESSIONAL LICENSING

State of Texas License #4010 – Professional Geoscientist

PROFESSIONAL SERVICES

NASA-related activities:

Lead instructor/organizer, field and classroom geology training of 2022 Astronaut Candidate class, Johnson Space Center and Taos/Questa area, New Mexico, September 2022.
 Panelist, SSERVI grant review panel, 2019
 Lead instructor/organizer, field and classroom geology training of 2017 Astronaut Candidate class, Johnson Space Center and Taos/Questa area, New Mexico Oct. 2017-June 2018.
 Invited speaker, co-lead, LEAG (Lunar Exploration Analysis Group) Geologic Astronaut Training Special Action Team workshop, Goddard Space Flight Center, Jan. 2016.
 Lead Instructor/organizer, field geology training of 2013 Astronaut Candidate class, Questa, New Mexico, July 2014.
 Classroom instructor, geology training of 2013 Astronaut Candidate Class, June, Johnson Space Center, June 2014.
 Co-chair of FEAT (Lunar Field Exploration and Analysis Team), 2006-present.
 Science staff, Operational Reconnaissance Testing of K-10 rovers and geological EVA planning, Ames Research Center, 2008, 2009, 2010.
 Invited participant, NASA Constellation Program Development of an Astronaut Geologic Training Curriculum 2008-2009.
 Organizer/Instructor, 2009 Astronaut Candidate Class, field geology training trips – northern New Mexico, June, August, 2010

Instructor, NASA astronaut training field geology trip -Los Alamos, NM: June, October, 2009; June 2010; August, 2011; June, 2012; August, 2013; September 2015.

Invited participant, LPI Center for Lunar Science and Exploration Texas Consortium for Higher Education workshop, Houston, TX 2009

Panel member, NASA NMAMA grant review panel, 2008, 2013.

Invited Participant, Workshop on Apollo astronaut geological training, Houston, TX, 2008.

Field Geology Instructor, Astronaut and NASA personnel field training exercise, Gila Bend, AZ, 2008.

Session convener, Lunar Exploration Advisory Group (LEAG) Biannual Meeting 2007.

Member, NASA Human Exploration of Mars Science Advisory Group (HEM-SAG) 2006- 2007.

Co-organizer and Field Geology Instructor, Field Conference on Best Practice for Geologic Field Work, Tucson, AZ, 2007.

Geological Society of America:

Session Chairman, Cordilleran Section Mtg., Spring, 1986.

Session Chairman, Annual Meeting, Fall, 1986.

Co-convener for symposium "Mesozoic geology of the Klamath Mts.", Spring, 1992.

Co-convener for topical session "The role of field geology and geophysics in the return to the Moon", Annual Meeting, 2008.

Field trip co-leader "Precambrian of the Llano Uplift", Annual Meeting, 2008.

American Association of Professional Geologists:

Session co-chairman for theme session "Lunar Field Exploration Equipment and Sample Documentation", Annual Conference, 2009

Reviewer:

Journals: Geological Society of America Bulletin, Geology, American Mineralogist, Journal of Geology, Journal of Metamorphic Geology, Applied Spectroscopy, Tectonics, Advances in Space Research.

Books: Geoscience Information Society, American Geophysical Union

Grant Proposals: National Science Foundation, American Chemical Society, NASA

Grant Review Panelist: NASA MMAMA panel, Spring 2010, Fall 2012; NSF SEES panel, Spring 2012; NASA SSERVI panel, Spring 2019

Educational Testing Service: Geology G.R.E. question writer (2001-2002)

Austin Geological Society:

Co-leader and guidebook author for annual Fieldtrip: Geology and historical mining, Llano Uplift Region, central Texas, Spring, 2000.

AWARDS AND HONORARY SOCIETIES:

Kniebel Distinguished Teaching Award for excellence in undergraduate teaching: 1994-1995, 2004-2005, 2007-2008, 2011-2012, 2017-2018, 2020-2021

Jackson School Outstanding Educator Award, 2011

Phi Beta Kappa Alpha of Texas Award for Distinction in Teaching, 2004

Houston Oil and Minerals Faculty Excellence Award, 2003

UT College of Natural Sciences Teaching Excellence Award, 2002

American Federation of Mineralogical Societies Honorary Scholarship Award, 1996

Miningco.com Award for best World Wide Web mineralogy site, 1998

Guest coach, Lady Longhorns, 1997
 Antarctic Service Medal, U.S. Antarctic Program, 1995
 Sigma Xi, 1981-present
 Phi Kappa Phi Honor Society, 1980-present
 Shell Graduate Student Fellowship, 1983-1984
 Arco Graduate Student Fellowship, 1982-1983
 Univ. of Texas Professional Development Award, 1983

INVITED CONFERENCE, SHORT COURSE AND WORKSHOP PARTICIPATION:

NAGT/GSA Designing Remote Geology Field Courses, online workshops, March-June, 2020
 NASA Workshop LEAG (Lunar Exploration Analysis Group) Geologic Astronaut Training Special Action Team, Goddard Space Flight Center, Jan. 2016; invited speaker, co-lead.
 NSF Cutting Edge Workshop – Using GIS and Remote Sensing to Teach Geosciences in the 21st Century, Bozeman, MT 2010, invited participant.
 NASA Ames Research Center – Operational Reconnaissance Testing of K-10 rovers and geological EVA planning, 2008; invited participant.
 NASA Workshop – Lunar surface site EVA planning, Houston, TX, 2008; invited participant
 NASA Workshop - Apollo astronaut geological training, Houston, TX, 2008; invited participant.
 Lunar Exploration Analysis Group (LEAG) Workshop on Enabling Exploration: The Lunar Outpost and Beyond, Houston, TX, 2007; Session convener, co-chair and invited speaker.
 NASA Workshop - Field Analog Sites, Houston, TX, 2007.
 NASA Advisory Council Workshop on Science Associated with the Lunar Exploration Architecture, Tempe, AZ, 2007; invited participant.
 NSF Workshop on Geopads; Applications of Tablet Computing in Field Geology, Bozeman, MT, 2007; invited participant.
 International Symposium on Antarctic Earth Science, 1995, Siena, Italy; speaker.
 New Mexico Geological Society Field Conference, 1994, Cimmaron, NM; co-leader.
 Penrose Conference on Blueschists and Related Eclogites, 1983, Bellingham, WA; invited participant.
 Short course on Ductile Deformation Mechanism and Microstructures, 1982, New Orleans, LA, Division of Structural Geology and Tectonic, Geological Society of America; participant.
 Workshop on the Philosophies of Tectonic Mapping, 1981, Austin, TX, American Association of Petroleum Geologists; student attendee.
 Short course on Amphiboles and other Hydrous Pyriboles, 1981, Cincinnati, OH, sponsored by Mineralogical Society of America; participant.

TEACHING ACTIVITIES

COURSES TAUGHT

GEO420: Introduction to Field and Stratigraphic Methods (32 semesters)
 GEO660: Field Geology (32 summer sessions)
 GEO347K: Gems and Gem Minerals (42 semesters)
 GEO298T: Supervised Teaching in Geology (field trip organizer/leader, 13 semesters)
 GEO379H: Honors Tutorial Course (5 semesters)
 GEO110C, 310C, 371C: Conference Courses (10 semesters)
 GEO379K: Special Studies in Advanced Geology (3 semesters).

GEO371C: GIS & GPS Applications in Earth Sciences (1 semester)
 GEO327G/386G: GIS & GPS Applications in Earth Sciences (25 semesters)
 GEO392M: Modern Geological Sciences (guest lecturer, 5 semesters)

PEER-REVIEWED ONLINE TEACHING RESOURCES

Helper, M.A., 2010, Spatial Analysis of Raster Data – An Antarctic Example, in Using GIS and Remote Sensing to Teach Geosciences in the 21st Century, National Association of Geoscience Teacher On the Cutting Edge Exemplary Teaching Activity collection, <https://serc.carleton.edu/NAGTWorkshops/gis/activities2/48022.html>

Helper, M.A., 2020, Geologic Mapping of a Virtual Landscape I, Light House Bay, in Teaching with Online Field Experiences, National Association of Geoscience Teacher Exemplary Teaching Activity collection, https://serc.carleton.edu/NAGTWorkshops/online_field/activities/236670.html

Helper, M.A., 2020, Geologic Mapping of a Virtual Landscape II, Three River Hills, in Teaching with Online Field Experiences, National Association of Geoscience Teacher Exemplary Teaching Activity collection, https://serc.carleton.edu/NAGTWorkshops/online_field/activities/237061.html

WORLD WIDE WEB SITE DEVELOPMENT AND CODING:

GIS & GPS Applications in Earth Sciences: www.geo.utexas.edu/courses/371c

Introduction to Field and Stratigraphic Methods:

www.geo.utexas.edu/courses/420k

Field Geology (Summer Field Camp): www.geo.utexas.edu/courses/660

Gems and Gem Minerals: www.geo.utexas.edu/courses/347k

- this site has received awards as the best mineralogy site on the web (Miningco.com, 1998), “site of the month” (Virtual Geoscience Professor and ITAL at UT, 1998, 1999) and a “Best Educational Resource” (Lightspan StudyWeb and StudySphere, 2001 and 2006)

GRADUATE STUDENT M.S. THESES AND PH.D. DISSERTATION COMMITTEES:

M.A./M.S. Committees:

- Hall, M. S.; Oblique slip faults in the northwestern Picuris Mountains of New Mexico: An expansion of the Embudo transform zone; 1988 (Lake Travis High School).
- Gillis, G. M.; Polyphase deformation and metamorphism of the Middle Proterozoic Coal Creek Serpentinite, Gillespie County, Texas; 1989 (Maxus).
- Fuqua, D. A.; Seismic structural analysis of the Perdido Fold Belt, Alaminos Canyon area, northwestern Gulf of Mexico; 1990 (ARCO).
- Rougvie, J.; Metamorphism and fluid flow in the Valley Spring Gneiss, Llano Uplift: Inferences from Rb-Sr and oxygen isotope data; 1993 (Assistant Professor, Beloit College).
- Rico, L.; Geometric and kinematic evolution of a complete detachment fold in a natural cross section; 1999 (Lecturer, Wilbur Wright College)
- Zumbro, J., Proterozoic history of the Valley Spring Gneiss near Honey Creek, Llano Uplift, Llano Co., Texas; 1999 (Geologic Consultant).
- Hoh, A., Geologic history of the Valley Spring Gneiss at Inks Lake State Park, Llano Uplift, Burnet Co., Texas; 2000(Geologic Consultant).
- Hunt, B. B. Precambrian geologic history of the Llano River region south of Mason, Texas; 2000 (Barton Springs Edwards Aquifer Conservation District).
- McGuire, J. B., High temperature carbonate replacement mineralization, metamorphism, deformation and intrusion in the Bryant District, Beaverhead County, Montana; 2003 (Practicing law, EPA district head)

- Fuller, R., Geologic studies of the Heimefrontfjella, Dronning Maud Land, Antarctica; 2004 (Practicing Law).
- Davis, B., Structural geology of Grenville-age talc deposits along the Steeruwitz Thrust, Van Horn region, Texas; 2007 (Chevron-Texaco).
- Wiles, T., The Permiability of "Impervious Cover" in Austin, Texas; 2007 (Encana).
- Carter, M., Geology of the south end of Beaverhead Island, Rhode Island, 2008 (Ph.D. program U. of Minnesota).
- Andring, M., Chemical tracers of probable recharge zones and flow paths, Edwards Aquifer, central Texas; 2010.
- Baitis, E., Patterns and Paleoshorelines of White Sands Dune Field, New Mexico; 2011 (UTeach Program).
- Hatley, E., Geometry of the Platten Gneiss shear zone, Austria, from quartz c-axis fabrics and 3D modeling; 2010
- Edlam, N., Madison Group paleokarst system and related cover strata, Devils Canyon, Wyoming; 2012.
- Swanson, T., Madison Group paleokarst system and related cover strata, Devils Canyon, Wyoming.
- Claus, V., Landscape develop and drainage amalgamation in the upper reaches of the Amazon, 2014.
- Hundley, T., Fracture characteristics of along a detachment fault in A-bomb canyon, southern Arizona, 2016.
- Clowe, T., Pleistocene to recent incision rates for the Rio Grande Gorge, northern New Mexico, 2017 (co-supervisor).
- Hirtz, J., Basin Architecture, Geochronology, and Sediment Provenance of the Belt-Purcell Supergroup: Implications for Reconstructions of the Mesoproterozoic Supercontinent Columbia (2021)
- Crues, A. G., Analysis of Atmospheric and Climate Effects of Wind Turbine Installations in West Texas (EER reader, in progress)
- Chen, Meiyang, Community-shared solar energy in central Texas; site assessment and criteria for design (EER cosupervisor and reader; 2021)
- Spangler, L., Stratigraphic record of the ARM in the Sacramento Mts, New Mexico; mapping the Bursum Formation (in progress).

Ph.D. Committees:

- Hoak, T. E.; Mesostructural, isotopic and geochemical constraints on the brittle tectonic evolution of the La Spezia region, northwest Apennines, Italy; 1993 (Consultant).
- Beam, E.; Tectonothermal effects of mid- and upper-crustal magmatism; 1996 (Exxon).
- Gary, M.; Karst hydrology of Sistema Zacatón, Tamaulipas, Mexico; 2010 (Edwards Aquifer Authority)
- Capaldi, T., Detrital zircon record of uplift in the central Andes, Peru; 2019 (UNLV faculty)
- Tewksbury-Christle, C., Constraint on the viscosity of blueschist during deformation and metamorphism along subducting slabs: 2021 (Fort Lewis College faculty)
- Doungkaew, N., Fracture growth in chemically reactive systems (in progress)
- Fullmer, S., Quaternary Carbonate Geomorphology of the Bahamas Archipelago: Records of Sea-level and climate change (in progress)

UNDERGRADUATE SENIOR THESIS SUPERVISION

- Bustos, J. A., Psychological motives for gem admiration. Plan II Honors Thesis, 1992.

- Chernoff, C. B., Microstructural analysis of poly-deformed, Mid-Proterozoic metasediments of the western Picuris Range, New Mexico: A deformational history of the Piedra Lumbre region. Senior honors thesis, 1992.
- Hunt, B. B., Structural relations among granite, gneiss and schist in an outcrop of Packsaddle Schist, western Llano Uplift, central Texas. Senior honors thesis, 1996.
- Schaffer, J. E., Differential global positioning system mapping (DGPS), petrography, and T-X constraints for the Loeffler Ranch marble lens, Mason County, Texas. Senior honors thesis, 1997.
- North, E., Metamorphic trend analysis of a low-pressure metamorphic system within the Hecla Mining District, Beaverhead County, Montana, Senior thesis, 1999.
- Schmid, D., Precision mapping with a tablet PC. Senior honors thesis, 2005.
- Kilventon, D., Geology of the Mason Mountain Wildlife Management Area, Mason County, Texas. 2006.
- Knowles, J., Fracture Orientations and Relationships in the Hueco Tanks Syenite, El Paso County, Texas. Senior honors thesis, 2008.
- Collins, A., Characterization of Blue Gem Topaz: A Comparative Analysis of Texas and Brazilian Topaz. Senior honors thesis, 2008.
- Wu, C., The Early Development of Geological Maps, 2008. Plan II thesis.
- Altobelli, M., Hydration and Textural Patterns in Balmorhea Blue Agate. Senior Honors Thesis, 2011.
- Yeatt, I., Application of Airborne LIDAR to Geologic Mapping in Central Texas, independent study presented at Geological Society of America National Meeting, Baltimore MD, 2015.

OTHER UNDERGRADUATE AND GRADUATE STUDENT SUPERVISION

Undergraduate honors thesis committees:

E. North (2002), C. Gordon (2004), W. M. Robertson (2006), T. Shin (2012), P. Especial (2013), R. Frier (2016), C. Black (2017), D. Ortega-Arroya (2017), K. Nicholaides (2018).

Undergraduate students employed as research assistants:

C. Chernoff (1/89 - 5/89), R. Johnson (11/96-5/97), C. Weismantle (5/97-8/97).

Graduate students employed as research assistants:

T. Hoak (9/87-1/88), K. Kempter (1/88-5/88)

Graduate and undergraduate student assistants, curation of gems and minerals:

J. Nelson, L. Potter, K. Stass, A. Ritter, R. Reed, D. Burns, L. Christian, M. Michelides, S. Bilich, S. Mills, T. Kahn, T. Hedayati, M. Tsai, M. Altobelli, M. Rupp, K. Moran, E. Rodriguez, A.R. Mursinna, Neriah Sosa.

ADMINISTRATIVE SERVICE

2019-2020t; Provost Review Committee of the Undergraduate School

2017 – present; JSG Undergraduate Advising Committee

2017- 2019; University Committee on Non-tenure track faculty

2016 – 2019; University Committee on Undergraduate Independent Inquiry Flags

2009 – present; UT GIS Committee (working group chair)

1996- present; Wild card examing member for Ph.D. qualifying exams

1996 – present; Field Camp Director: organize and run six-week field course (GEO660) for undergraduate geoscience majors

1996 – present; Oversight of Departmental vehicles fleet (10 vehicles) and field equipment

1996 – present; Acting curator of Departmental gem and mineral collections

2009 – 2010; Ad-hoc Undergraduate Equipment Committee (chair)

2007 –2014; Information Technology Steering Committee
 2007 – 2009; B.S. General Geology curriculum revision committee
 2007 - 2008, Geoscience Education Faculty Search Committee
 2006; Strategic Planning Committee for Undergraduate Education
 2006 – 2012; Undergraduate Admissions Committee
 1998 – 2000; Department representative to College of Natural Science Field Safety Committee
 1997 - 2015, Ex-officio member, Undergraduate Advising and Awards committee

OTHER DEPARTMENTAL SERVICE

2001 – present, Event presenter for Department open house associated with all ExploreUT events since inception
 2002 – present, Installation and oversight of hallway mineral displays for the Jackson Geoscience Building
 2012 – Outreach Lecture and CDROM - Astronauts, Robots and Rocks: Preparing for Geologic Planetary Exploration
 2000 - Outreach Lecture and CDROM - True Gems: Origins and Identification
 1999 - Event presenter for Department open house associated with UT Interactive
 1998 - Design and installation of new gem and mineral displays in Geology Building
 1988 - Refurbishment of Department's mineral separation facilities

SCHOLARLY ACTIVITIES

STATEMENT OF CURRENT RESEARCH/CONTRIBUTIONS

Current research focuses on the Precambrian geology and tectonics of Texas, northern Mexico, the southwestern U.S. and the western margin of the East Antarctic craton. Earlier research explored Nevadan and younger orogenic processes in the Klamath Mountains of northern California and southwestern Oregon. Studies of Precambrian rocks in New Mexico and Texas with graduate and undergraduate students have documented deformation, metamorphism and plutonism that bear on the origin of Proterozoic tectonism in these regions. Comparable ongoing research in the Precambrian rocks of the East Antarctic craton is testing recently proposed Late Precambrian global plate reconstructions that posit that the Precambrian rocks of the southwestern U.S. and the East Antarctic craton were once part of a contiguous belt of rocks prior to the latest Precambrian breakup of a supercontinent.

Research results from field and laboratory studies of Klamath Mt. rock suites have documented the geometry, timing, nature and extent of deformation and metamorphism associated with Pacific plate convergence at this latitude, and contributed to our understanding of the formation and structure of the crust along this part of the western margin of North America.

Most recent (2005-present) activities include co-chairing an initiative to begin training astronauts in field geological techniques in preparation for a return to the Moon, training astronauts in geological field work, development of techniques for geologic mapping and note taking with field tablet computers and developing and testing robotic techniques for acquiring geologic field data.

Recent undergraduate thesis-related research has explored the geochemistry, crystallography and mineralogy of Texas topaz and the origin and hydration patterns in Balmorhea blue agate.

New and ongoing research is examining terrace deposits along the upper Rio Grande River in New Mexico to constrain the age and incision rate of this reach of the river, and the application of airborne LIDAR to geological mapping in central Texas.

RESEARCH GRANTS:

NSF Grant #OPP-9117996, Extension to "Geologic Studies in the Shackleton Range Coats Land, and Dronning Maud Land, East Antarctica: A North American Connection", 1996-1997 (\$64,977), with I. Dalziel and W. Gose.

NSF Grant #DPP-9117996, "Geologic Studies in the Shackleton Range Coats Land, and Dronning Maud Land, East Antarctica: A North American Connection", 1992-1995 (\$604,628), with I. Dalziel, N. Walker, and W. Gose.

NSF Grant #EAR-8709333, "Rb-Sr, U-Pb, K-Ar Geochronologic study of the Condrey Mountain Schist, Klamath Mountains, northern California and southwestern Oregon", 1987-1989 (\$79,972), with F. McDowell and N. Walker.

GSA Penrose Research Grant, 1981 (\$600)

University of Texas Geology Foundation Grants, 1981, 1982, 1983.

PUBLICATIONS (* indicates refereed publications):

Articles in journals and books/published maps:

- * Coleman, R. G., **Helper, M. A.**, and Donato, M. M., 1983, Geologic Map of the Condrey Mountain Roadless Area, Siskiyou County, California: U.S. Geological Survey Miscellaneous Field Study Map MF-1540-A, Scale 1:50,000.
- * Helper, M. A., 1986, Deformation and high P/T metamorphism in the central part of the Condrey Mountain window, north-central Klamath Mountains, California and Oregon, *in* Evans, B. W., and Brown, E. H., eds., *Blueschists and Eclogites: Geological Society of America Memoir 164*, p. 125-142.
- * Mosher, S., and Helper, M. A., 1988, Chapter 16: Interpretation of polydeformed terranes, *in* Marshak, S. and Mitra, G. eds., *Basic Methods of Structural Geology: Prentice-Hall, New Jersey*, p. 361-384.
- * Folk, R. L., Pursell, V., Greenberg, J., Mosher, S., **Helper, M. A.**, and Carter, K., 1989, Inverted tectonic veins in the Triassic Portoro Limestone, Portovenere Area (La Spezia), Italy: *Annales Tectonicae*, v. 2, p. 25-33.
- * Bauer, P. W., Helper, M. A., 1994, Geologic Map of Trampas quadrangle, Picuris Mountains, Taos and Rio Arriba Counties, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Geologic Map 71, Scale 1:24,000.
- Dalziel, I. W. D., **Helper, M. A.**, Hutson, F., and Grimes, S., 1994, Geologic investigations in the Shackleton Range and Coats Land Nunataks, Antarctica: *Antarctic Journal of the United States*, v. 29, p. 4-6.
- Barnes, C. G., Donato, M. M., Barnes, M. A., Yule, J. D., Hacker, B. R., and **Helper, M. A.**, 1995, Geochemical compositions of metavolcanic and metasedimentary rocks, western Jurassic and western Paleozoic and Triassic Belts, Klamath Mountains, Oregon and California: U. S. Geological Survey Open File Report 95-227-A, 63 p.

- Helper, M. A., 1995, Valley Spring Gneiss at Spring Creek, Inks Lake State Park, in Mosher, S., ed., Guide to the Precambrian geology of the southeastern Llano Uplift, Fieldtrip guide for the 12th International Basement Conference, Norman, Oklahoma, p.17-19.
- Helper, M. A., Hutson, F.E., and Grimes, S.W., 1994, Geologic investigations in the Shackleton Range and Coats Land Nunataks, Antarctica: *Antarctic Journal of the United States*, v. 29, p. 4-6.
- Helper, M. A., 1996, Valley Spring Gneiss at Spring Creek, Inks Lake State Park, in Mosher, S., ed., Guide to the Precambrian geology of the eastern Llano Uplift, central Texas: Fieldtrip guide for the Geological Society of America 30th annual south-central section meeting, Austin, TX, p. 30-31.
- *Gose, W. A., **Helper, M. A.**, Connelly, J. N., Hutson, F. E., and Dalziel, I. W. D., 1997, Paleomagnetic data and U-Pb isotopic age determinations from Coats Land, Antarctica: Implications for late Proterozoic plate reconstructions: *Journal of Geophysical Research*, v. 102, no. B4, p. 7887-7902.
- Hutson, F., **Helper, M. A.**, Dalziel, I. W. D. and Grimes, 1997, Initial results of geologic investigations in the Shackleton Range and southern Coats Land Nunataks, Antarctica: *Antarctic Journal of the United States*, v. 32, p. 234-236.
- *Reed, R. M., Roback, R. C., and Helper, M. A., 1998, Nature and age of ductile deformation associated with the "anorogenic" Town Mountain Granite, Llano Uplift, Central Texas: in Hogan, J. P. and Gilbert, M. C. (eds.), *Basement Tectonics* 12, p. 291-292.
- *Roback, R. C., Hunt, B. B., and **Helper, M. A.**, 1999, Mesoproterozoic tectonic evolution of the western Llano uplift, central Texas: the story in an outcrop: *Rocky Mountain Geology*, v. 34, p. 275-287.
- Helper, M. A., 2000, Geology of the eastern Llano uplift: in Kyle, J. R. (ed.), *Geology and Historical Mining, Llano Uplift Region, Central Texas*, Austin Geological Society Guidebook 20, p. 33-47.
- *Barnes, C. G., Donato, M. M., Yule, J. D., Thomlinson, S. L., Harper, G. D., Thompson, A. G., and **Helper, M. A.**, 2002, Correlation of Mesozoic terranes in the northern and central Klamath Mountains: Geochemical and geochronological constraints, *Bulletin of the Geological Society of America*.
- *Fong, T., Bualat, M., Deans, M.C., and 33 others, 2010, Robotic Follow-up for Human Exploration, American Institute of Aeronautics and Astronautics, 8605, p. 1-24.
- *Schmitt, H. H., Snoke, A. W., **Helper, M. A.**, Hurtado, J. M., Hodges, K., V., and Rice, J. W., 2011, Motives, methods and essential preparation for planetary field geology on Moon and Mars, in Garry, W. B., and Bleacher, J. E., eds., *Analogs for Planetary Exploration: Geological Society of America Special Paper 483*, p. 1-15. doi: 10.1130/2011.2483(01).
- *Hasan, S.M., Steel, R.J., El Barkooky, A., Hamdan, M., Olariu, C., and **Helper, M.A.**, 2012, Stacked, Lower Miocene tide dominated estuary deposits in a

transgressive succession, Western Desert, Egypt, *Sedimentary Geology*, v. 282, p. 241-255. doi: 10.1016/j.sedgeo.2012.09.013.

- Svoboda, C., **Helper, M.A.** and Hunt, B.B., 2014, Central Texas GIS Geologic Map Project: Phase I, Barton Springs Edwards Aquifer Conservation District Technical Note 2014-1201.
- *Eppler, D., Evans, C., Tewksbury B., **Helper, M.**, Bleacher, J., Fossum, M., Ross, D., Feustel, D., 2016, Geologic training for America's astronauts, *GSA Today*, v. 26, no. 8, p. 34-35.
- *Gardner, J.E., Nazworth, C., **Helper, M.A.**, and Andrews, B. J., 2018, Inferring the nature of pyroclastic density currents from tree damage: The 18 May 1980 blast surge of Mount Saint Helens, *Geology*, v. 46, 795-798. doi10.1130/G45353.1.
- *Hildebrand, E.A., Grillo, K.M., Sawchuck, E.A., Pfeiffer, S.K. Conyers, L.B., Goldstein, S.T., Hill, A.C. Janzen, A., Klehm, C.E., **Helper, M.**, Purity, K., Ndiema, E., Ngugi, C., Shea, J.J. and Wang., H. 2018, A monumental cemetery built by eastern Africa's first herders near Lake Turkana, Kenya, *Publications of the National Academy of Science*, v. 115, p. 8942-8947. doi.org/10.1073/pnas.1721975115
- *Clow, T., Behr, W., **Helper, M. A.**, 2019, Pleistocene to recent geomorphic and incision history of the northern Rio Grande river gorge, New Mexico: constraints from field mapping and cosmogenic ³He surface exposure dating, *Geosphere*, v. 15, no. 3, p. 820–838, <https://doi.org/10.1130/GES02017.1>
- *Tewksbury-Christle, C. M., Behr, W. M., & **Helper, M. A.**, 2021, Tracking deep sediment underplating in a fossil subduction margin: Implications for interface rheology and mass and volatile recycling. *Geochemistry, Geophysics, Geosystems*, v. 22, e2020GC009463. <https://doi.org/10.1029/2020GC009463>
- Hunt, B. B., J. G. Paine, C. M. Woodruff, Jr., and **M. A. Helper**, 2021, Integrating digital and traditional field methods into geologic mapping: An example from Central Texas: *GeoGulf Transactions*, v. 71, p. 141–148.
- *Hunt, B. B., Johnson, Brann, and **Helper, Mark**, 2021, Geologic map of the Grit quadrangle, Mason County, Texas: Bureau of Economic Geology, The University of Texas at Austin, Open-File Map No. 252, map scale 1:24,000, 2 sheets.
- *Rendall, B., Wilson, K., Kerans, C., **Helper, M.** and Mohrig, D., 2022, Coriolis effect recorded in Late Pleistocene Stage 5e Bahamian aeolianites, *Geology*, v. 50, p. <https://doi.org/10.1130/G49454.1>
- *Guinn, N., Gardner, J., and **Helper, M.A.**, 2022, Dynamic pressure evolution within the 18 May 1980 Mount St. Helens pyroclastic density current: evidence from tree damage, *Bulletin of Volcanology* 84, <https://doi.org/10.1007/s00445-022-01548-6> .
- *Hassan, S.M., de Wit, M. J., **Helper, M.A.** and Hussein, A.W., in review, Sedimentology of alluvial fan deposits near Natures Valley, South Africa, *Journal of African Earth Science*.

Papers presented with published abstracts

- Helper, M. A., 1983, Deformation-metamorphism relationships in a regional blueschist-greenschist facies terrane, Condrey Mt. Schist, north central Klamath Mts., N. California: Geological Society of America Abstracts with Programs, v. 15(5), p. 427.
- Helper, M. A., 1983, Subduction related deformation and metamorphism in the regional blueschist-greenschist terrain of the Condrey Mountain Window, Klamath Mts., northern California: Geological Society of America Abstracts with Programs, v. 15(6), p. 594.
- Coleman, R. G., and Helper, M. A., 1983, The significance of the Condrey Mountain Dome in the evolution of the Klamath Mountains, California and Oregon: Geological Society of America Abstracts with Programs, v. 15(5), p. 294.
- Helper, M. A., 1986, The age and direction of thrusting along the western margin of the Condrey Mountain Window, Klamath Mts., California: Geological Society of America Abstracts with Programs, v. 18(2), p. 116.
- Helper, M. A., 1986, Early Cretaceous metamorphic ages for high P/T schists in the Condrey Mountain Window, Klamath Mountains, northern California: An inlier of Franciscan? Geological Society of America Abstracts with Programs, v. 18(6), p. 116.
- Helper, M. A., Walker, N. W., and McDowell, F. W., 1988, U-Pb and K-Ar age constraints for Late Jurassic-Early Cretaceous deformation in the central Klamath Mtns., NW Calif. and SW Oregon: Geological Society of America Abstracts with Programs, v. 20, p. 231.
- Thompson, A., Barnes, C. G., Helper, M. A., and Walker, N., 1988, Correlation of melange terranes, Klamath Mts., CA and OR: Geological Society of America Abstracts with Programs, v. 20.
- Helper, M. A., Walker, N. W., and McDowell, F. W., 1989, Early Cretaceous metamorphic ages and Middle Jurassic U-Pb zircon protolith ages for the Condrey Mountain Schist, Klamath Mtns., NW Calif. and SW Oregon: Geological Society of America Abstracts with Programs, v. 21, p. 92.
- Fuqua, A., Behrens, E. W., Helper, M. A., and Wilson C. W., 1991, Seismic structural analysis of the Perdido Fold Belt, implications for deep water hydrocarbon potential: Spring Mtg., Society of Exploration Geophysics, Gulf Coast Section.
- Helper, M. A., 1992, Evidence for successive Late Jurassic-Early Cretaceous underplating during High P/T metamorphism of the Condrey Mountain Schist, Central Klamath Mts., Calif. and Oregon: Geological Society of America Abstracts with Programs, v. 24, no. 5, p. 33.
- Carter, K. E., Reese, J., and Helper, M. A., 1993, Precambrian extension in the Llano Uplift, Texas: Geological Society of America Abstracts with Programs, v. 25.

- Chernoff, C. B., Helper, M. A. and Mosher, S., 1993, Evidence for fourth generation structures in the Piedre Lumbre Region, western Picuris Mts., New Mexico: Geological Society of America Abstracts with Programs, v. 25, p. 86.
- Reed, R. M., and Helper, M. A., 1994, Evidence for solid-state deformation of 1.1 Ga "Anorogenic" granites in the Llano Uplift, central Texas: Geological Society of America Abstracts with Programs, v. 26, p. 25.
- Gose, W. A., Dalziel, I. W. D., Helper, M. A., Hutson, F., and Grimes S., 1994, A positive test of the SWEAT hypothesis: New paleomagnetic data from the Grenville rocks of Coats Land, Antarctica: Geological Society of America Abstracts with Programs, v. 26, no. 7.
- Gose, W. A., Dalziel, I.W.D., Helper, M. A., Hutson, F., and Grimes, S., 1994, The East Antarctica-North America connection: New paleomagnetic results from 1 Ga old rocks from Coats Land, Antarctica: EOS, Transactions of the American Geophysical Union, v. 75, no. 44, p. 199.
- Gose, W. A., Dalziel, I. W. D., Helper, M. A., Hutson, F., and Connelly, J., 1995, Paleomagnetic data and U-Pb Isotopic ages from Coats Land, Antarctica: a test of the Laurentia-East Antarctica ("SWEAT") connection: Proceedings of the International Symposium on Antarctic Earth Sciences, Siena, Italy.
- Helper, M. A., Grimes, S. W., and Dalziel, I.W.D., 1995, Basement-cover relations and fabrics in the central Read Mountains, Shackleton Range, Antarctica (abst.), Proceedings of the International Symposium on Antarctic Earth Sciences, Siena, Italy.
- Helper, M. A., Gose, W. A. and Roback, R.R., 1996, Virtual geomagnetic pole positions from 1.1 Ga intrusive rocks of the Llano Uplift, central Texas (abst.), Geological Society of America Abstracts with Programs, v. 27, no. 1, p. 18.
- Hunt, B. B., Helper, M. A., and Roback, R. C., 1996, Structural relationships among Precambrian granite, gneiss and amphibolite in an outcrop of Packsaddle Schist, western Llano Uplift, Central Texas, Geological Society of America Abstracts with Programs, v. 27.
- Helper, M., Roback, R., and Connelly, J., 1996, Comparison of Proterozoic basement provinces of the Southwestern US and East Antarctic craton: implications for Neoproterozoic plate reconstructions: Geological Society of America Abstracts with Programs, v. 28, no. 6, p.
- Reed, R. M., Roback, R. C., and Helper, M. A., 1998, Nature and age of deformation associated with the "anorogenic" Town Mountain Granite, Llano Uplift, Central Texas: *In* Hogan, J. P. and Gilbert, M. C. eds., Proceedings of the 12th International Conference on Basement Tectonics, Norman, Oklahoma, USA, May 1995, Kluwer Academic Publishers, Nowell, MA, p. 291-292.
- Helper, M. A., Connelly, J. C., and Dalziel, I. W. D., 2000, Isotopic provinces and Mesoproterozoic tectonism in the Shackleton Range, Antarctica: comparisons with Mojavia, Geological Society of America Abstracts with Programs, v. 32, no. 7, p. 397.

- Connelly, J.N., Helper, M., Fuller, R., Dalziel, I., McDowell, F. 2002, Amalgamation of Coats Land/Western Dronning Maud Land with the East Antarctic craton: Evidence from Heimefrontfjella, Dronning Maud Land, Antarctica, Geological Society of America Abstracts with Programs, v. 33, paper no. 14-27.
- Schmid, D. and Helper, M.A., 2005, Geological mapping with a tablet PC; Lessons from the Llano Uplift, central Texas (abst.), Geological Society of America Abstracts with Programs, v. 37, no. 3.
- Schmitt, H.H., Helper, M.A., Muehlberger, W., and Snoke, A. W., 2006, Field Exploration Science for a return to the Moon, Eos Transactions, American Geophysical Union, Fall Meeting, Invited Abstract #U42B-01.
- Choi, E.M., Helper, M.A. and Ghafoor, N., 2007, M.U.L.E. – A Robotic Field Assistant for Lunar Astronauts, 11th International Space University Annual Symposium: “Why the Moon?”; Strasbourg, France.
- Helper, M.A., Schmitt, H.H., Muehlberger, W.R., and Snoke, A.W. 2007, Astronaut Geological Training for Lunar Exploration, NASA Advisory Council Lunar Workshop, Tempe, AZ:
https://www.infonetic.com/tis/lea/papers/Helper.Lunar_Workshop_Abstract_M_Helper.pdf.
- Knoop, P. and the Geopad website authoring team, 2007, Using Digital Information Technologies in Geoscience Field Courses (abst.), Geological Society of America Abstracts with Programs, v. 39.
- J. Heldmann, J. Levine, J. Garvin, D. Beaty, M.S. Bell, T. Clancy, C.S. Cockell, G. Delory, J. Dickson, R. Elphic, D. Eppler, D. Fernandez-Remolar¹, J. Gruener, J.W. Head, **M. Helper**, V. Hipkin, M. Lane, J. Levy, R. Millikan, J. Moersch, G. Ori, L. Peach, F. Poulet, J. Rice, K. Snook, S. Squyres, and J. Zimbelman, 2007, Interim Results From The MEPAG Human Exploration Of Mars Science Analysis Group (HEM-SAG), Lunar Exploration Analysis Group (LEAG) Biannual Meeting, Houston, TX, LPI Contribution, v 1371, p. 3018.
- Helper, M.A, and Snoke, A.W., 2007, Field Exploration and Astronaut Training Activities and Goals: The FEAT Perspective. Invited, Lunar Exploration Analysis Group (LEAG) Biannual Meeting, Houston, TX.
http://www.lpi.usra.edu/meetings/leag2007/presentations/20071001.helper_snoke.pdf
- JS Levine, JB Garvin, AD Anbar, DW Beaty, MS Bell, RT Clancy, CS Cockell, JE Connerney, PT Doran, GT Delory, JT Dickson, RC Elphic, DB Eppler, DC Fernández-Remolar, JW Head, **M Helper**, 2008, Scientific Goals and Objectives for the Human Exploration of Mars, 1. Biology and Atmosphere/Climate, Proceedings of the 39th Lunar and Planetary Science Conference, v. 39, p. 1338.
- JB Garvin, JS Levine, AD Anbar, DW Beaty, MS Bell, RT Clancy, CS Cockell, JE Connerney, PT Doran, GT Delory, JT Dickson, RC Elphic, DB Eppler, DC Fernández-Remolar, JW Head, **M Helper**, 2008, Scientific Goals and Objectives for the Human Exploration of Mars, 2. Geology and Geophysics, Proceedings of the 39th Lunar and Planetary Science Conference, v. 39, p. 1343.

- D. C. Fernández-Remolar, J. S. Levine, J. B. Garvin, D. W. Beaty, A. D. Anbar, M. S. Bell, R. T. Clancy, C. S. Cockell, J. E. Connerney, G. Delory, J. Dickson, P. Doran, R. Elphic, D. B. Eppler, J. E. Gruener, J. W. Head, **M. Helper**, J. Heldmann, V. Hipkin, M. D. Lane, J. Levy, R. Millikan, J. Moersch, G. G. Ori, L. Peach, F. Poulet, J. W. Rice, K. J. Snook, S. W. Squyres and J. R. Zimbelman, 2008, Human Search For Fossil Preservation Windows In The Geological Record Of Mars, 5th Astrobiology Science Conference, Santa Clara, CA.
- Eppler, D. B., Feustel, A., Erickson, J. M., Hodges, K., Keszthelyi, L. P., **Helper, M.**, Muehlberger, W. R., Phinney, W., Snoke, A., and Tewksbury, B. J., 2008, Apollo/Constellation Geologic Training Workshop: Reviewing Apollo's Accomplishments and Preparing a New Generation of Geologic Explorers for Lunar Field Geology, Geological Society of America Abstracts with Programs, v. 40, p.335.
- J. E. Bleacher, **M.A. Helper**, C.R. Neal, G.R. Osinski, M.S. Robinson, C.K. Shearer, A.W. Snoke, P.D. Spudis, 2008, Lunar Field Geology and EVA Planning Based on Science Rationale, LPI Contribution 1415, 2166.
- Fong, T., Broxton, M., Deans, M.C., **Helper, M.**, Hodges, K.V., Schaber, G.G., Schmitt, H.H., and Smith, T., 2009, Traverse Planning for Robotic Recon and Human Exploration of Hadley Rille. Proceedings of the Lunar and Planetary Science Conference.
- Deans, M.C., Fong, T., Lee, P., Hodges, K.V., **Helper, M.**, Landis, R., Riley, S., Bualtat, M. Pacis, E., Kabayashi, L., 2009, Robotic Scouting for Human Exploration. American Association of Petroleum Geologist Annual Convention, Denver, CO.
- Deans, M.C., Broxton, M., Fong, T., **Helper, M.**, Hodges, K.V., Schaber, G.G., Schmitt, H.H., and Smith, T., 2009, Planning Lunar Surface Traverses for Robotic Scouting Followed by Crew. American Association of Petroleum Geologist Annual Convention, Denver, CO.
- Mosher, S., **Helper, M.** and Levine, J., 2008, The Texas Grenville Orogen, Llano Uplift, Texas, Guidebook for Trip 405, Geological Society of American Annual Meeting, Houston, TX. University of Texas at Austin, 48 p.
- Hatley, E. R., Carlson, W. D., Stuewe, K., and **Helper, M.**, 2009, Assessing the kinematic significance of the Plattengneis, a major intracrustal transport horizon in the Koralpe region, eastern Alps, Paper No. 37-2, Geological Society of America Annual Meeting, Portland, OR.
- Schmitt, H.H., Foing, B.H., **Helper, M.**, Horz, F.P., Plescia, J., Snoke, A. and Zacny, K., 2010, Lunar Field Geological Exploration. White Paper for the NASA Planetary Science Division Decadal Survey, 6 p.
<http://www.lpi.usra.edu/decadal/leag/DecadalField.pdf>
- Helper, M.A., Lee, P., Bualtat, M., Adams, B., Deans, M., Fong, T., Heggy, E., Hodges, K. V., Hurtado, J.M. Jr., and Young, K., 2010, Robotic follow-up to human

geological and geophysical field work: Experiments at Haughton crater, Devon Island, Canada, Geological Society of America Abstracts with Programs, Vol. 42, No. 5, p. 66.

http://gsa.confex.com/gsa/2010AM/finalprogram/abstract_180577.htm

Heggy, E., **Helper, M.A.**, Fong, T., Lee, P., Deans, M., Bualat, M., Hurtado, J.M. Jr., Altobelli, M., Palmer, E., and Hodges, K.V., 2010, Exploring the Lunar Subsurface Ice Hypothesis Using EVA and Robotic Follow-up: The Haughton Crater Lunar Analog Study, Geological Society of America Abstracts with Programs, Vol. 42, No. 5, p. 66.

http://gsa.confex.com/gsa/2010AM/finalprogram/abstract_180633.htm

Lee, P., Braham, S., Fong, T., **Helper, M.A.**, Hurtado, J.M. Jr., McKay, C., and Schutt, J.W., 2010, Planetary Field Geology: Right and Wrong Lessons From Terrestrial Analogs, Geological Society of America Abstracts with Programs, Vol. 42, No. 5, p. 66.

http://gsa.confex.com/gsa/2010AM/finalprogram/abstract_181719.htm

Young, K., Hodges, K.V., Evans, C.A., Bualat, M., Deans, M., Fong, T., Heggy, E., **Helper, M.A.**, and Hurtado, J.M. Jr., 2010, The Use of Handheld X-ray Fluorescence Technology in Planetary Surface Exploration, Geological Society of America Abstracts with Programs, Vol. 42, No. 5, p. 66.

http://gsa.confex.com/gsa/2010AM/finalprogram/abstract_180429.htm

Fong, T., Bualat, M., Deans, M., Heggy E., **Helper, M.**, Hodges, K., Lee, P., 2010, Improving Lunar Exploration with Robotic Follow-up, [LPI Contribution No. 1595, p. 24.](#)

Heggy, E., Lee, P., Bualat, M. G., Fong, T., **Helper, M. A.**, Hodges, K., Taylor, G. J. and Deans, M., 2010, Assessing the Potentials and Complementarities of Human and Robotic Subsurface Exploration on the Moon: Understanding Buried Structural Elements and Potential Ice Enrichment in Support of EVA Activities Using Radar Methods, LPI Contribution No. 1530, p.3035.

Deans, M.C., Bualat, M., Fong, T., Essam, H., **Helper, M.**, Hodges, K.V., Lee, P., 2011, Field Testing Robotic Follow-up For Exploration Field Work, Proceedings of the Lunar and Planetary Science Conference, v. 42, 2601.

Heggy, E., **Helper, M. A.**, Fong, T., Lee, P., Deans, M., Bualat, M., Hurtado, J.M., Hodges, K.V., 2011, Potential In Situ Exploration of Subsurface Ice on the Moon Using EVA and Robotic Follow-Up: The Haughton Crater Lunar Analog Study, Proceedings of the Lunar and Planetary Science Conference, v. 42, 2829.

Lee, P., Braham, S., Deans, M., Fong, T. Heggy, E. **Helper, M.**, Hodges, E.H., Hoffman, S.J., and Schutt, J.W., 2011, Pressurized Rover-based IVA Field Science: Lessons Learned From Moon and Mars Analog Studies at Haughton-Mars Project, Devon Island, High Arctic, Proceedings of the Lunar and Planetary Science Conference, v. 42, 2656.

- Helper, M., 2011, GIS Analysis of Antarctica Beneath the Ice and Effects of Ice Removal and Isostatic Rebound, Geological Society of America Abstracts with Programs, Vol. 43, No. 5, p. 404.
http://gsa.confex.com/gsa/2011AM/finalprogram/abstract_197448.htm
- Fong, T., Deans, M.C., Bualat, M., Heggy, E., **Helper, M.**, Hodges, K.V., Lee, P., Zacney, K., 2012, Using Robots Before and After Humans to Improve Space Exploration, Proceedings of the Global Space Exploration Conference 2012, Paper ID: GLEX-2012.04.1.5x12344.
- Yeats, I., **Helper, M.** and Hunt, B.B., 2015, Application of Airborne LIDAR to Geologic Mapping in Central Texas (abst.), Geological Society of America Abstracts with Programs, Vol. 47, No.7, p.34.
<https://gsa.confex.com/gsa/2015AM/webprogram/Paper269479.html>
- Eppler D., J. Bleacher, E. Bell, B. Cohen, M. Deans, C. Evans, T. Graf⁵, J. Head, **M. Helper**, K. Hodges, J. Hurtado, K. Klaus, D. Kring, H. Schmitt, J. Skinner, P. Spudis, B. Tewksbury, K. Young, A. Yingst, 2017, A Framework for Lunar surface science exploration, New Views of the Moon 2 workshop, European Lunar Symposium, v. , p.
- Gardner, J., Nazworth, C., **Helper, M. A.**, Andrews, B., 2017, Standing Trees in the Midst of Destruction: Insights into the 18 May 1980 Pyroclastic Density Current (abst.), International Association of Volcanology and Chemistry of the Earth's Interior Scientific Assembly, v. , p.
- Tewksbury-Crystal, C., Behr, W., **Helper, M.**, 2017, Rheological Properties and Heterogeneities Along the Down-Dip Extent of a Subduction Megathrust: Insights from the Condrey Mountain Schist, Northern California, Eos Transactions, American Geophysical Union, Fall Meeting, Abstract # T23F-0680.
- Capaldi, T., Horton, B., Stockli, D., **Helper, M.**, Odlum, M., Mackaman-Lofland, C., Ortiz, G., Alvarado, P., 2018, Miocene to recent foreland basin partitioning and shortening along distal foreland uplifts during flat-slab subduction in western Argentina, (abstract), JSSRS.
- Graff, T. G., Young, K. E., Evans, C. A., Bleacher, J. E., Zeigler, R., Tewksbury, B., **Helper, M.**, Hurtado Jr., J. M., 2018, Earth and Planetary Science Training for the 2017 Astronaut Class (extended abstract), Proceeding of the 49th Lunar and Planetary Science Conference, Abstract 2547, LPI Contrib. No. 2083.
- Eppler, D.B., Young, K., Bleacher, J., Klaus, K., Barker D., Evans, C., Tewksbury, B., Schmitt, H., **Helper, M.**, Hurtado, J., Deans, M., 2018, Returning to the Moon: Building the Systems Engineering Base for Successful Science Missions (abstract), New Views of the Moon-Asia workshop.
- Young, K. E., Evans, C. A., Bleacher, J. E., Graff, T. G., Zeigler, R., Tewksbury, B., **Helper, M.**, Hurtado, J. M. Jr., and Eppler, D., 2018, The Recent Evolution of Astronaut Geoscience Training: Preparing the Next Generation of Planetary Explorers (abstract), Geological Society of America Cordilleran Section Mtg, v. 50, Paper no. 32-4.

- Tewksbury-Christle, C.M., Behr, W.M., and **Helper, M.A.**, 2018, Rheological heterogeneity along the intermediate-depth subduction interface: a case study from the Condrey Mountain Schist, northern CA (abstract), AGU Gordon Conference.
- Tewksbury-Christle, C.M., Behr, W.M., and **Helper, M.A.**, 2018, Rheology of the downdip extent of a subduction megathrust: underplating history and role of serpentine in the Condrey Mountain Schist, northern California (abstract), Eos Transactions AGU Fall meeting, T22C-08.
- Evans, C.A., Bleacher, J.E., Graff, T.G., Young, K.E., **Helper, M. A.**, Tewksbury, B. J., Hurtado, J. M. Jr, Edgar, L. A., Thompson, R. A., Stefanov, W. L., Osinski, G. R., Regberg, A. B., Zeigler, R. A., Bauer, P. W., Wilkinson, M. J., Zimmerer, M. J., Timmons, M. and Read, A., 2018, Field camp for astronauts: NASA's geoscience training program for planetary exploration (abstract), Eos Transactions AGU Fall meeting, P31H-3798.
- Tewksbury-Christle, C.M., Behr, W.M., and **Helper, M.A.**, 2019, The rock record of deep sediment underplating: Implications for crustal recycling and delivery of volatiles to the mantle (abstract), European Geophysical Union, ID number EGU2019-4887.
- Graff, T.G., Evans, C.A., Bleacher, J.E., Young, K.E., **Helper, M.A.**, Tewksbury, B.J., Hurtado, J.M. Jr, Edgar, L.A., Thompson, R.A., Stefanov, W.L., Osinski, G.R., Regberg, A.B., Zeigler, R.A., Bauer, P.W., Wilkinson, M.J., Zimmerer, M.J., Timmons, M. and Read, A. 2019, Earth and planetary science training for NASA's newest astronauts: 2018 training and 2019 planning (extended abstract), Proceeding of the 50th Lunar and Planetary Science Conference Lunar, Abstract ##, LPI Contrib. No. ##.
- Herring, R., Olariu, C., and **Helper, M.**, 2019, The Fate of the Mississippi River Sediment Amidst the Waning Phase of the Last Glacio-eustatic Cycle: A Volumetric Quantification and Modelling of Late Quaternary Deposition Coeval with the Cessation of the Late Wisconsin Glacial Stage (abstract), Eos Transactions AGU Fall meeting, Abstract ID#: 596286.
- Guinn, N., Gardner, J., and **Helper, M.A.**, 2019, Characterizing Dynamic Pressure Variations from Tree Damage Resulting from the 18 May 1980 Pyroclastic Density Current of Mount St. Helens (abstract), Eos Transactions AGU Fall meeting, Abstract ID#: 590946.
- Behr, W.M., Kotowski, A., Tewksbury-Christle, C.M., Stockli, D., **Helper, M.A.**, 2019, Coherent underplating vs. subduction channel melange mixing along the deep subduction interface: insights from thermobarometry and geochronology on exhumed subduction complexes, (abstract), Eos Transactions AGU Fall meeting, Abstract ID#: 58716.
- Tewksbury-Christle, C.M., Behr, W.M., **Helper, M.A.**, and Stockli, D., 2019, Coherent Underplating in the Erosive Franciscan Subduction Margin: Rock Record of the Condrey Mountain Schist, Northern California, (abstract), Eos Transactions AGU Fall meeting, Abstract ID#: 573935.

- Tewksbury-Christle, C.M., Behr, W.M., **Helper, M.A.**, 2020, Rock record constraints on the seismic signature of subduction interface shear zones (abstract), European Geophysical Union, Abstract ID#EGU2020-3285.
- Guinn, N., Gardner, J., and **Helper, M.A.**, 2020, Characterizing Dynamic Pressure Variations from Tree Damage Resulting from the 18 May 1980 Pyroclastic Density Current of Mount St. Helens (abstract), European Geophysical Union, <https://doi.org/10.1002/essoar.10501835.1>.
- Guinn, N., Gardner, J., **Helper, M.** 2020, Characterizing the evolution of dynamic pressure resulting from the 18 May 1980 pyroclastic density current of Mount St. Helens using tree damage, International Geoscience and Remote Sensing Symposium, #1742.
- Tewksbury-Christle, C., Behr, W., and **Helper, M.**, 2020, Rock record constraints on the seismic signature of subduction interface shear zones, EGU General Assembly 2020, Online, 4–8 May 2020, EGU2020-3285, <https://doi.org/10.5194/egusphere-egu2020-3285> .
- Eppler, D.B., D. Barke, E. Bell, J. Bleacher, C. Evans, T. Graff, J. Head, **M. Helper**, K.V. Hodges, J. Hurtado, K. Klaus, C. Neal, H. H. Schmitt, O J. Skinner, B. Tewksbury and K.E. Young, 2020, Planning Framework for executing lunar scientific exploration, NASA Science Mission Directorate White Paper.
- Rendall, B., Wilson, K., Kerans, C., **Helper, M.A.** and Mohrig, D., 2020, Coriolis effect entombed in Pleistocene Bahamian dune fields, AGU, Fall Meeting, abstract #EP058-03.
- Price, B., Kerans, C., Mohrig, D.C., Wilson, K. and **Helper, M.A.**, 2020, Longshore Transport-Driven Accretionary Growth of Carbonate Islands: Holocene and Pleistocene Examples from the Lucayan Archipelago, AGU, Fall Meeting, abstract # EP053-0001.
- Tewksbury-Christle, C.M., Behr, W.M., **Helper, M.A.**, Stockli, D., 2021, Tectonic evolution of the Condrey Mountain Schist: An intact record of Late Jurassic to Early Cretaceous Franciscan subductions and underplating (abstract), Geological Society of America Cordilleran Section Mtg., Abstract #363145.

CDROMS

- Helper, M. A., 2000, True Gems: Origins and Identification, University of Texas Department of Geological Sciences Outreach Lecture Series, v. 5.
- Helper, M. A., 2012, Astronauts, Robots and Rocks: Preparing for Geologic Planetary Exploration, University of Texas College of Natural Science Environmental Science Institute Hot Science-Cool Talks Series v. 76.

PUBLISHED BOOK REVIEWS

- Helper, M. A., 1992, Review of Planning for Field Safety: Geoscience Information Society Newsletter, No. 135, p. 8.

Helper, M. A., 1998, Structural Geology and Map Interpretation: EOS, Transactions, American Geophysical Union, v.79, p. 261.

INVITED LECTURES

"Using Virtual Landscapes for Remote Teaching" webinar June, 2020, recording at: <https://register.gotowebinar.com/recording/2528513213481328653>

"Astronauts, Robots and Rocks: Preparing for Geologic Planetary Exploration", UT College of Natural Science Environmental Science Institute Hot Science-Cool Talks Series, Fall 2011.

"Field work in Antarctica", UT Deans Scholars, Fall, 2006.

"Geologic Mapping in the 21st Century", Austin Geological Society, Spring, 2005.

"True Gems: Origins and Identification", Environmental Science Outreach Lecture Series Spring, 2000

"Geological Exploration of the American West, 1868-1880: The Great Western Surveys", Fall 2004, 2005, University of Texas Freshman Forum Seminar.

"Isotopic provinces and Mesoproterozoic tectonism in the Shackleton Range, Antarctica: comparisons with Mojavia", GSA annual meeting, Reno, NV, October, 2000

"Testing S.W.E.A.T.: Were Antarctica and the S.W. US once contiguous?", Baylor University, September, 1999.

"Tectonic significance of Early Cretaceous blueschists in the northern Klamath Mountains, California", Baylor University, October, 1992.

"Age, origin and tectonic significance of greenschists and blueschists in the Condrey Mountain Window, Klamath Mts., N. California", Texas Tech University, November, 1992.

"Deformational, metamorphic, and isotopic age constraints on the origin of the Condrey Mountain Schist: An inlier of Franciscan in the Klamath Mountains?", University of New Orleans, May, 1989.

UT DGS LECTURES

"Geological training of astronaut; the last ten years", UT POSSE, Spring, 2016

"Geologic mapping in the 21st Century", Hard Rock Seminar, Spring, 2005.

"Proterozoic geology of the Shackleton Range, Antarctica; Implications for the SWEAT Hypothesis", Technical Sessions, January 25, 2001

"Precambrian crystalline rocks of western Dronning Maud Land, Antarctica, and the hows, whys and wheres of an unusual trip around the world", Hard Rock Seminar with J. Connelly, March 19, 1997.

"A reappraisal of paleomagnetic and U-Pb data from Coats Land, Antarctica: New implications from late Proterozoic plate reconstructions", Hard Rock Seminar, Nov. 27, 1996.

"Paleomagnetic data and isotopic ages from Coats Land, Antarctica: implications for late Proterozoic plate reconstructions", Hard Rock Seminar with I.W.D. Dalziel and W. Gose, Nov. 27, 1994.

"Fieldwork at 80° South", Hard Rock Seminar, Feb., 1993

"A Klamath window with a Franciscan view? Geochronometry in the Condrey Mountain window, northern California and southwestern Oregon", Hard Rock Seminar, Sept. 27, 1989.

PUBLIC SERVICE

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| 1991 | Mentor for students in the gifted and talented program of Leander Independent School District. |
| 1992 | "Coach" for Pflugerville middle school Science Olympiad rocks and mineral team. |
| 1994-1998 | Lectures to Austin Gem and Mineral Society: "Gemstone Enhancement", "Research in Antarctica".

Lectures to Williamson Country Gem and Mineral Society: "What can we learn by studying the geology of Antarctica?", "Initial results of research on the Precambrian rocks of the Shackleton Range, Antarctica"

Lecture to Austin Bead Society: "Properties and identification of bead materials" |
| 1996 | Field guidebook "Geology of central Texas" for the Austin Gem and Mineral Society, for free distribution to area K-12 teachers. |
| 1999 | "Meet the UT Scientist", Austin Science Fun Day lecture and demonstration. |
| 2000 | Public lecture and educational CDROM "True Gems: Origins and identification" for UT CNS/DGS Outreach program. |
| 2001 | Mentor for Pflugerville high school and middle school Science Olympiad national team

Presenter at UT-BEG sponsored Earth Science Week |
| 1988-present: | 1) Respond to inquires from the public to UT and the BEG regarding gemstones and minerals.
2) Talks on geology to grade school and middle school classes in the A.I.S.D.
3) Judge for A.I.S.D. high school science fair.
4) "Science expert" for A.I.S.D. Math and Science Hotline. |