

VITA
Dr. Mark Alan Helper
Spring, 2022

MAILING ADDRESS:

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TELEPHONES:

Office: 512/471-1009
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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 personnel 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)

- 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, Meiyan, 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.
- Yeat, 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

2019-2020; 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.
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- 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.

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

1991	Mentor for students in the gifted and talented program of Leander Independent School District.
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- 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.